MACINTOSH PORTABLE: PAGE 144 • NEW MAC IIci: PAGE 114

MACWORLD

The Macintosh® Magazine November 1989 $4.95 Canada $5.95

Do Not Remove

APPLE'S PORTABLE MACINTOSH

PAGE 144

EXCEL 2.2 vs. FULL IMPACT vs. WINGZ

ACCOUNTING SOFTWARE
Third Annual Survey

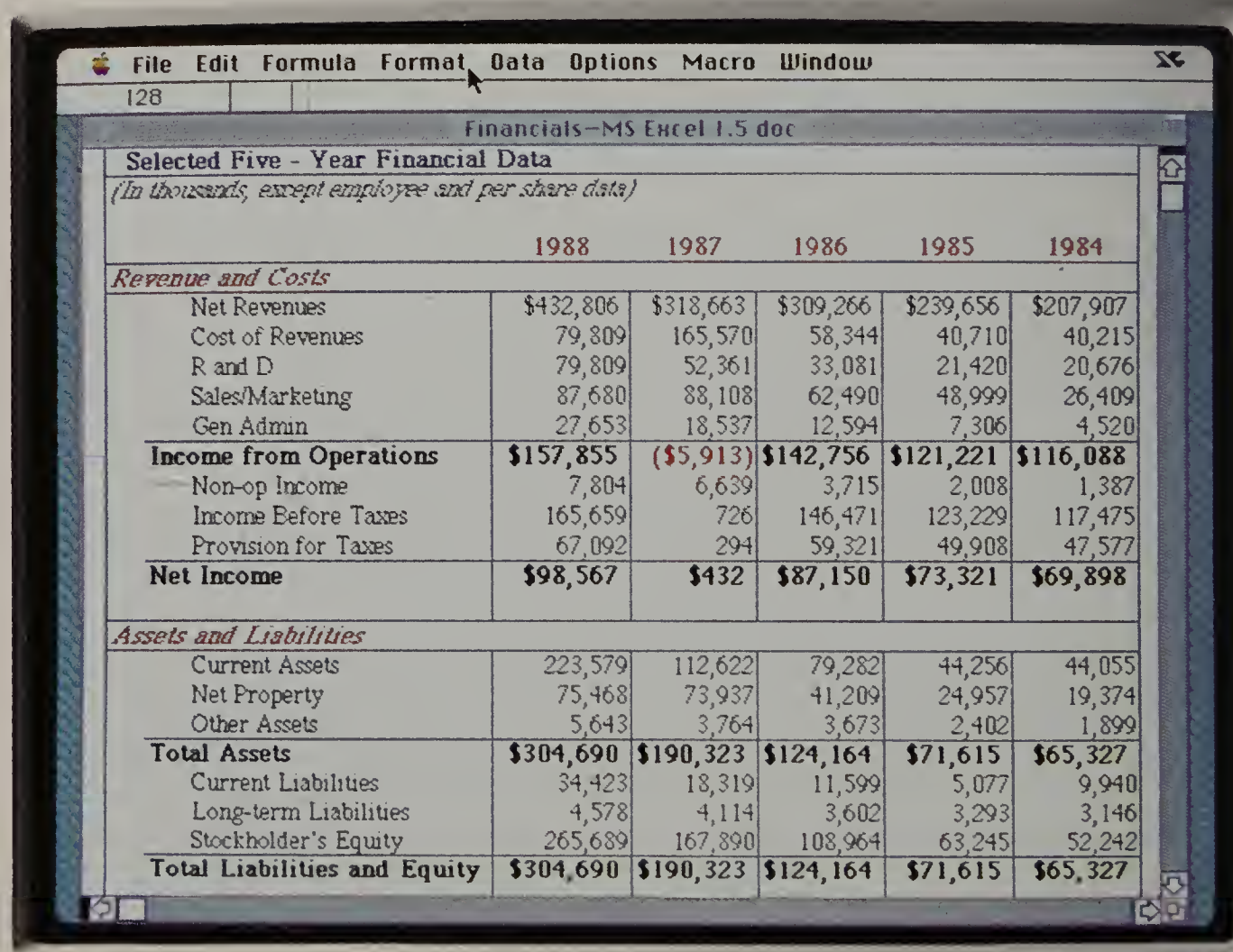
APPLETALK AND NETWORKING
All You Need to Know

SUPERSTACKS CONTEST
Best HyperCard Stacks of '89

300MB DRIVES
Lab Report

FRONT DESK

90% of Macintosh spreadsheet users have been working on this program.



Selected Five - Year Financial Data

(In thousands, except employee and per share data)

	1988	1987	1986	1985	1984
Revenue and Costs					
Net Revenues	$432,806	$318,663	$309,266	$239,656	$207,907
Cost of Revenues	79,809	165,570	58,344	40,710	40,215
R and D	79,809	52,361	33,081	21,420	20,676
Sales/Marketing	87,680	88,108	62,490	48,999	26,409
Gen Admin	27,653	18,537	12,594	7,306	4,520
Income from Operations	**$157,855**	**($5,913)**	**$142,756**	**$121,221**	**$116,088**
Non-op Income	7,804	6,639	3,715	2,008	1,387
Income Before Taxes	165,659	726	146,471	123,229	117,475
Provision for Taxes	67,092	294	59,321	49,908	47,577
Net Income	**$98,567**	**$432**	**$87,150**	**$73,321**	**$69,898**
Assets and Liabilities					
Current Assets	223,579	112,622	79,282	44,256	44,055
Net Property	75,468	73,937	41,209	24,957	19,374
Other Assets	5,643	3,764	3,673	2,402	1,899
Total Assets	**$304,690**	**$190,323**	**$124,164**	**$71,615**	**$65,327**
Current Liabilities	34,423	18,319	11,599	5,077	9,940
Long-term Liabilities	4,578	4,114	3,602	3,293	3,146
Stockholder's Equity	265,689	167,890	108,964	63,245	52,242
Total Liabilities and Equity	**$304,690**	**$190,323**	**$124,164**	**$71,615**	**$65,327**

To learn more, call for the Microsoft Excel 2.2 brochure, (800) 541-1261, Dept. J72. Customers in Canada, call (416) 673-9811. Outside North America, call (206) 882-8661. © Copyright 1989 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and *Making it all make sense* is a trademark of Microsoft Corporation. Macintosh and Mac are registered trademarks of Apple Computer, Inc.

So have we. Introducing Microsoft Excel 2.2.

In 1985, not long after the Macintosh® was unveiled, Microsoft® Excel became the most compelling reason to buy one.

Within minutes, it became a standard on the Macintosh. Before we knew it, a full 9 out of 10 Macintosh spreadsheet users were swearing by it. Not surprisingly, they still are.

Used to be, 1MB was enough. Now with Microsoft Excel 2.2, you can take full advantage of the 8 megs in today's most powerful Macintoshes.

But, of course, we weren't satisfied to leave well enough alone—and Microsoft Excel version 2.2 has come to the small screen. In a big way.

In mathematical terms, 2.2 is greater than 1.5. In technical terms, your spreadsheets aren't limited to 1MB of memory—version 2.2 makes the most of even 8meg machines.

Which translates into spreadsheets of outrageous proportions.

Equally outrageous: 40% faster calculations—thanks to advanced intelligent recalc.

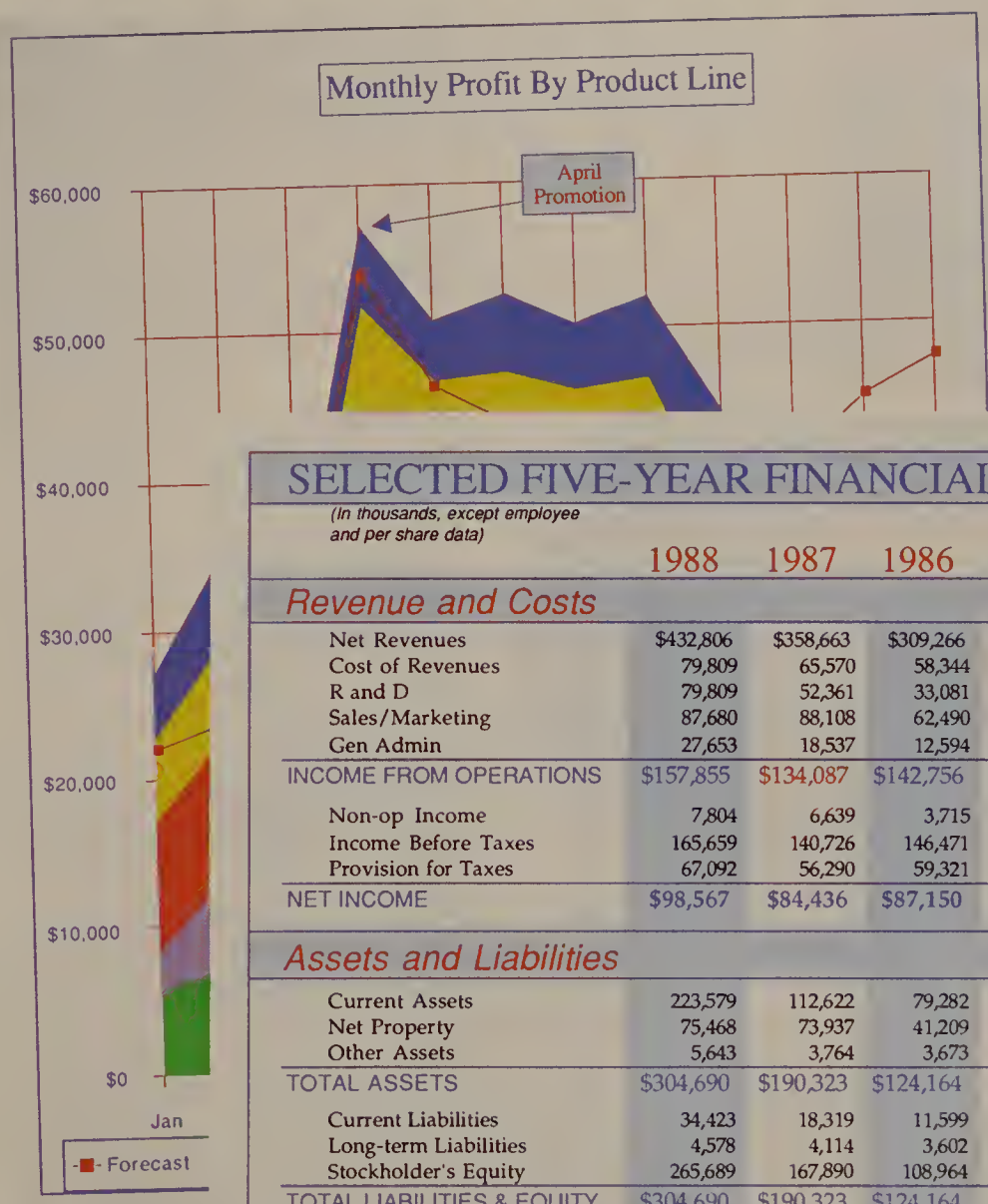
As for presentation? Version 2.2 also lets you highlight data in ways well worth highlighting: You can pick up to 256 different fonts per sheet, including up to six styles and eight colors. You can change row height. You can shade. And basically pack your documents with more visual punch than ever before.

Microsoft Excel version 2.2. Another improvement designed to make Mac® enthusiasts even more enthusiastic.

Something 90% of you are already used to. And you other 10% easily can be.

Microsoft®

Making it all make sense.™



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TOTAL LIABILITIES & EQUITY	$304,690	$190,323	$124,164	$71,615	$65,327
Working Capital	189,642	173,468	127,766	119,489	77,041
Number of Employees	3,456	2,727	1,681	1,390	1,086
Common Stock Data					
Net Income per Share	$1.13	$1.64	$1.94	$1.90	$2.59
Book Value per Share	$4.56	$3.56	$2.29	$1.46	$0.78
Cash and Investments	$2.65	$1.60	$0.83	$0.64	$0.48
Average Shares Out	87,535	83,258	44,956	38,634	26,984
Shares Out/Year-end	86,790	51,305	26,589	15,905	9,082
Key Ratios					
Return on Net Revenues	23%	23%	28%	31%	34%
Return on Total Assets	32%	44%	70%	102%	107%
Return on Stock Equity	37%	50%	80%	116%	134%

Now pick from 256 fonts. Change row height. Shade. Add notes. And get used to the sound of applause.

MACWORLD

The Macintosh® Magazine November 1989

Is Apple's new portable the ultimate dream machine or only a step in the right direction? Turn to page 144 for a preview of Apple's latest offering. (Photo by Mark Johann.)

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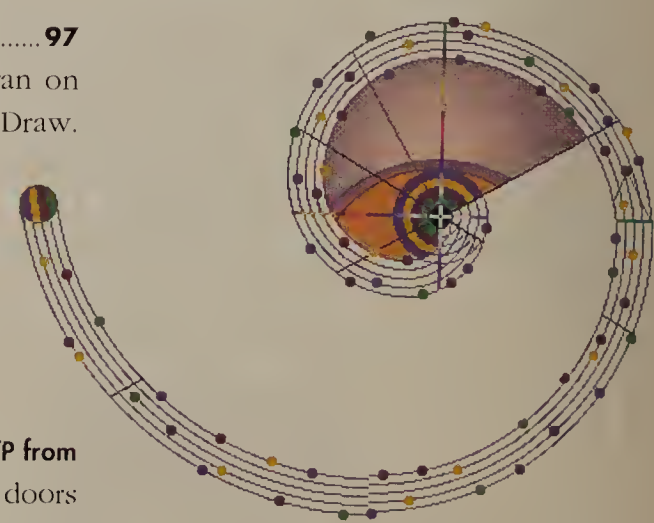

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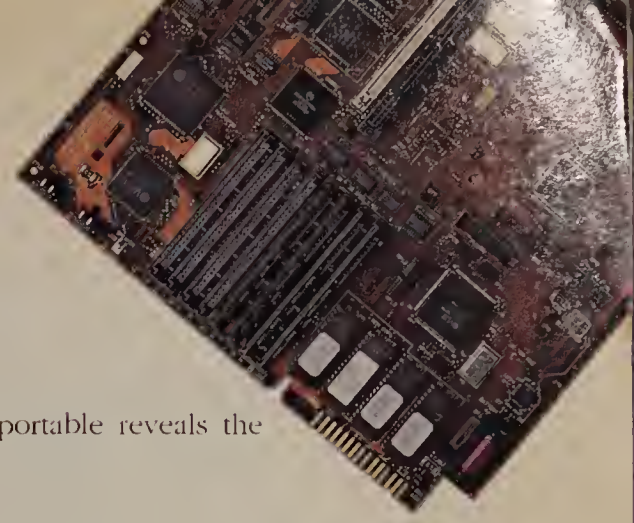
Late-breaking news.

Macworld News 114

■ **Apple Introduces the High-Performance IIci** Big things come in small packages. ■ **Midrange DTP from Silicon Beach** New features at an old-fashioned price. ■ **RetixMail Brings x.400 to the Mac** Opening doors to the world. ■ **ModelShop: 3-D in the Fast Lane** Playing what-if with architecture. ■ **Matching Colors on Printers and Monitors** Tektronix's new technology. ■ **CompuServe Refines Navigational Equipment** Host-Micro Interface means smoother sailing. ■ **Micron Technology Enters Graphics Adapter Fray** More color for the SE/30 and the Mac II. ■ **Microsoft Mail: Almost Like Being There** Tying your workgroup together. ■ **Not Gone with the Wind** Saving Hollywood's greatest films. ■ **Mac II on Steroids** 88000 on a NuBus board. ■ **PostScript Clone on a Disk** Talking PostScript to non-PostScript printers. ■ **Mitsubishi Introduces 37-Inch Monitor, 24-Bit Color Printers** Color in, color out. ■ **We Now Return You to the Program Already in Progress** When memory never sleeps. ■ **Reader Survey: Computer-Related Health Problems** Readers' complaints.



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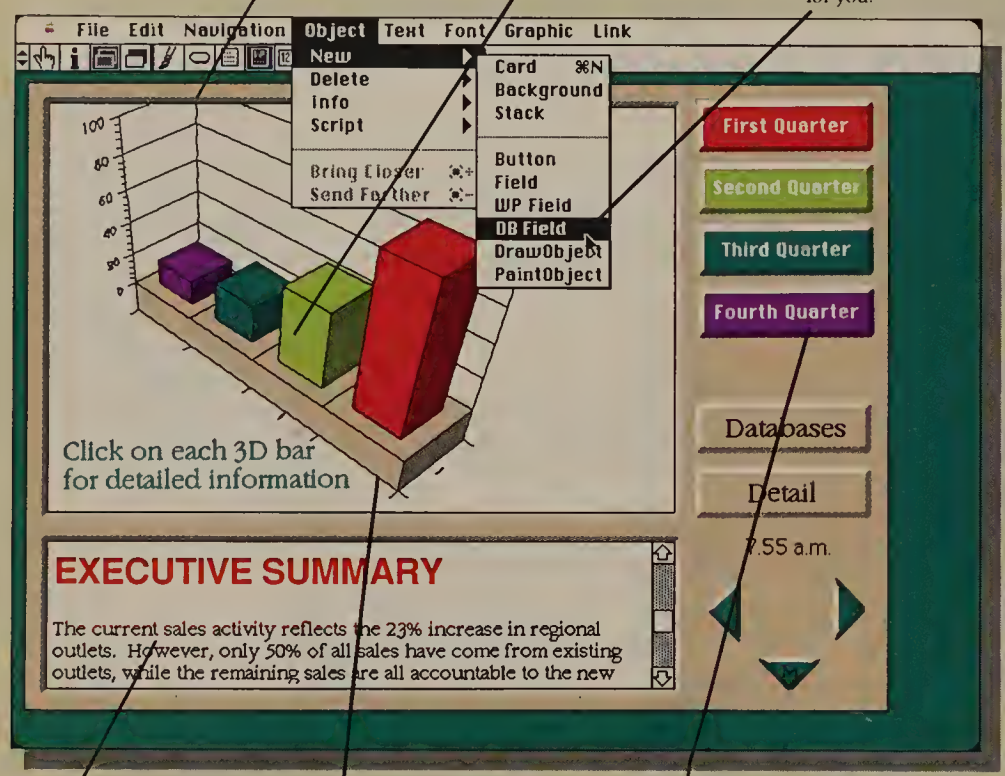

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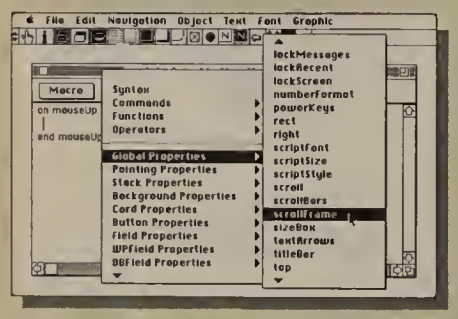

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COLOR

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Page 1

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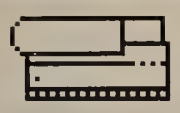

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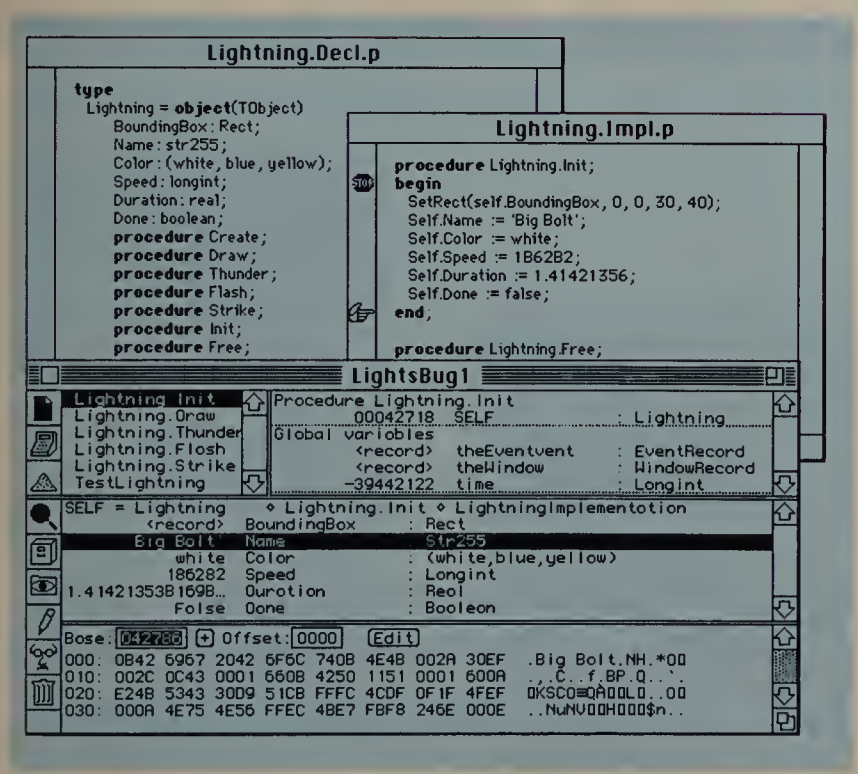
Only THINK Pascal debugs Pascal objects while the program is running.



Only THINK Pascal's debugger steps you through source code displaying variables and their values in plain English.

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For example, say you programmed an object, (Lightning Bolt), and it crashed. Your mission: debug.

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You'll also blaze through compiling at 44,000 lines per minute. And link any size program in less than 2 seconds. THINK Pascal not only makes programming faster, its high-quality, ultra-compact code makes faster programs.

THINK PASCAL SPEED

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- Links any size program in less than two seconds.
- Multi-pass optimizing compiler creates compact, commercial quality code.
- Allows virtually unlimited program size.
- Generates 32-bit clean code.

With an integrated environment of an ultra-fast compiler, editor, instant linker, and source level debugger, THINK Pascal gives you total Pascal speed. Any way you measure it. Try THINK Pascal, the #1 Pascal on the Mac. Its speed will shock you.

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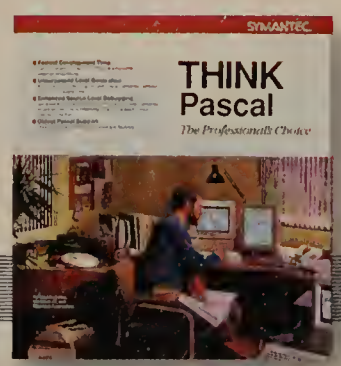

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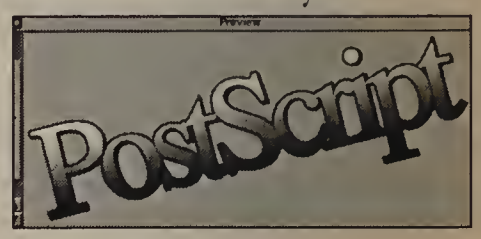
1 The NeXT™ Computer System is the first computer in the world (and so far the only) to use read/write/erasable optical storage. While PCs today are typically equipped with Winchester drives that store 20 to 40 MB, a single optical disk can store 256 MB. Plus, it is removable, for portability and added security. This dramatically new technology provides storage that is simultaneously vast, reliable and cost-effective—a combination unmatched by computers of any size.

2 NeXT has made the power of UNIX® usable by mere mortals. UNIX is the high-performance operating system used by workstations to achieve true multitasking and superior networking. Unfortunately, it has always been the antithesis of user-friendly. NeXT has given UNIX a revolutionary new interface—one that is both visual and intuitive. Now computer users of every level can instantly wield this tremendous power, with no technical knowledge whatsoever.

3 To achieve the power needed for the 90s, NeXT bypassed traditional workstation architecture and went directly to that of a mainframe. This eliminates bottlenecks and attains an extraordinary level of system "throughput"—the true measure of computer performance. Only through the use of VLSI (Very Large Scale Integration) technology could this architecture be reduced in size so that it could fit inside a desktop computer. It's a mainframe on two chips.

4 While PostScript® has long been the industry standard for printing, NeXT has made it fast enough to also be used on the display. This "unified imaging model" ensures that what you see on



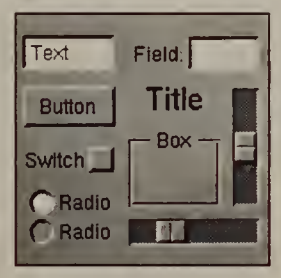
the display is precisely what you will get on paper. All your work, in any size type and any degree of rotation or magnification, appears with perfect 92-dots-per-inch clarity on the NeXT MegaPixel Display. And with laser precision at 400 dpi on the NeXT Laser Printer.

IN THE 90s, WE'L
ONLY TEN REAL BREAKTH
HERE ARE SEV

5 The NeXT Computer System is the first to be capable of producing CD-quality sound. Without requiring any additional equipment. This feat is made possible by a chip that has been specifically designed for the task of manipulating sound—the Digital Signal Processor (DSP). Because this processor is standard in every NeXT machine, software developers will be able to call upon its power to enrich programs we use every day. Now computers will not just be seen, but heard.

6 NeXT Mail takes electronic communications beyond anything you've seen on a personal computer before. Now you can send and receive multimedia mail—including text (with varied type fonts, styles and sizes), graphics and voice messages. And despite its high level of sophistication, NeXT Mail is so intuitive, you may not ever need to open the manual. NeXT Mail is built into the system, along with Ethernet and TCP/IP, so the NeXT machine can quickly become a part of existing networks.

7 Programmers can create software on the NeXT Computer up to ten times faster than on any other computer—the result of a breakthrough called NextStep.® It gives software developers the power to create the graphical user interface portion of their applications (often the most time-consuming and difficult part) without any programming at all. This revolutionary environment means we will see more programs, and better ones, in less time than ever possible before.



These seven breakthroughs will change the way we use computers in the 90s. Which is why Businessland, the leading supplier of computers to corporate America, chose the NeXT Computer System as the workstation they will offer. Call us at 800-848-NeXT, and we'll send you a 28-page brochure describing the NeXT Computer. We'll also give you the address of your nearest Businessland Center. There, you can experience for yourself the first seven breakthroughs of the 90s. And get a good idea where the next three will come from.

L PROBABLY SEE ROUGHS IN COMPUTERS. EN OF THEM.

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Pizza Prospects

Pizza Oven Sales Opportunities

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Pacific

Midwest

South Atlantic

PizzaTyme
1777 Bolo Drive
Fresno, CA 93701
Pat Muncey
1988 Sales: $176,891

376 miles

Franchise
- Piz-O-Rama
- PizzaTyme
- Pizza Perfect
- Multiple

Houston Area
Piz-O-Rama = 6
Pizza Tyme = 7
Pizza Perfect = 5
Total = 18

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MACWORLD

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November 1989, Volume 6, Number 11

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BPA

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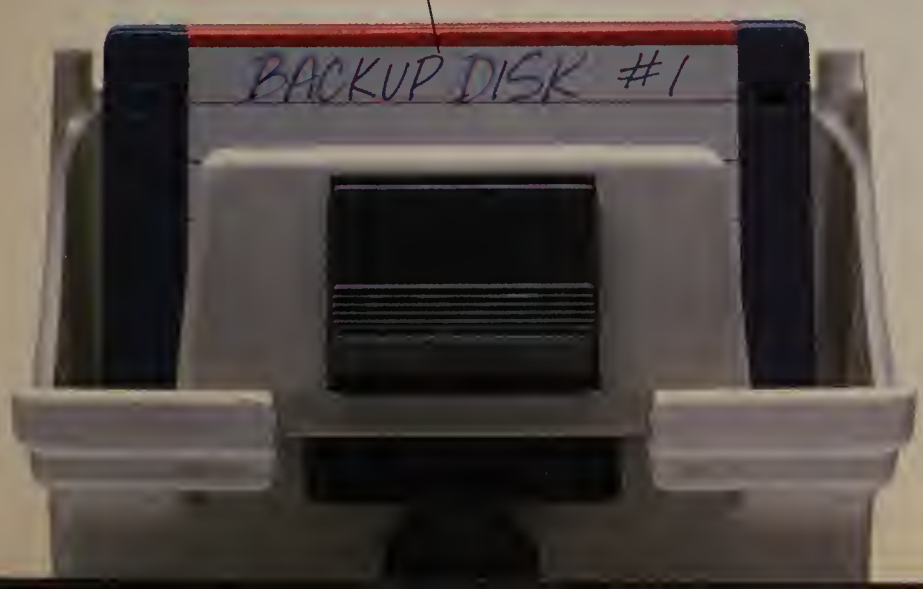

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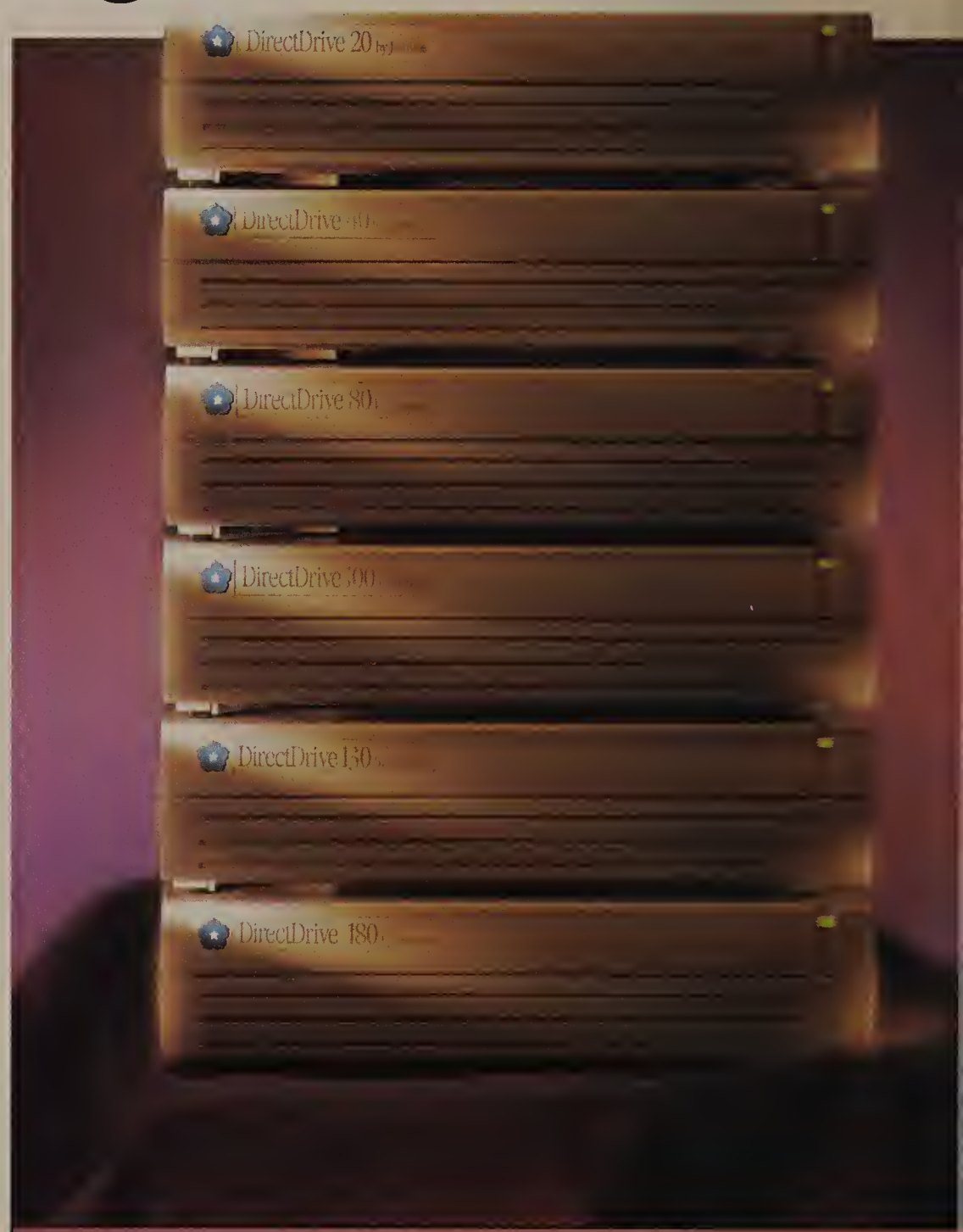
Jasmine Celebrates Its Third Anniversary With The Savings Event Of 1989.

Three years ago Jasmine set the standard for value by bringing the first affordable external hard drive to the Macintosh market. Today we're pleased to celebrate our third anniversary with a spectacular savings event—Jasmania!! Buy direct from Jasmine before December 31, 1989 and save.

The Award Winning DirectDrive Series.

Jasmine continues to set the quality standard with the hard drives that swept the 1989 Macworld World Class Awards. Macworld readers selected Jasmine #1 in the "80MB or less" category, and in every single ranking (that's all 5) in the "above 80MB" category!

Jasmine DirectDrives are also the value standard. Every drive is bundled with DriveWare,™ Jasmine's exclusive formatting and partitioning software which insures your data by performing drive diagnostics and error corrections on the fly; SUM II by Symantec™ which lets you recover data from a mistakenly-initialized hard disk; DemoWare,™ a collection of demonstration versions of some of the most popular programs available; plus 5MB of public domain and shareware software.



All Jasmine DirectDrives Feature

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MACWORLD Magazine 1989 World Class Award Winner

Capacity	Regular direct price	**Jasmania direct price** (thru 12/31/89)
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DirectServe File Server.

Now you can liberate your Macintosh from the mundane task of network file serving.

DirectServe is a combination of hardware and software that's designed specifically to be a high-performance, low-cost file server. DirectServe can support up to 255 workstations with Mac IIcx speed, for less than the cost of a Mac Plus and AppleShare software!

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Stand-alone DirectServe	$1795
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The first. And still champion.

PixelPaint.™ The first color paint program for the Macintosh.®

Now there are two new SuperMac™ color paint programs. For creating superior color graphics with ease. PixelPaint 2.0, to get the most out of your 8-bit color Mac.® And PixelPaint Professional,™ for the highest quality graphics in 8, 16, 24 or 32-bit modes.

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PixelPaint Professional. Exceptional graphics on *any* color Mac.

We've revolutionized the features we pioneered with PixelPaint. To take advantage of the millions of colors available in 16, 24, and 32-bit modes. And to dramatically improve how you work in 8-bit mode.

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Make the right choice.

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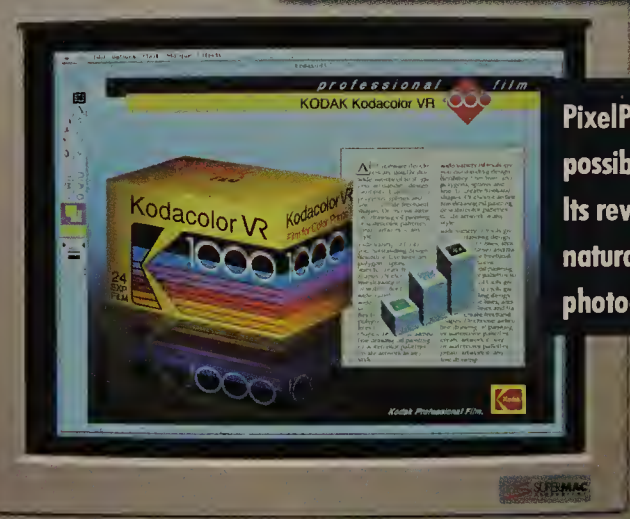

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PixelPaint 2.0 gives you outstanding performance and value on your 8-bit, 256-color system. With easy-to-use tools, and a PANTONE selector for specifying industry-standard colors.

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MAC BULLETIN

INDUSTRY NOTES

Du Pont Does PostScript

Du Pont is planning to license Adobe's PostScript for use in its 4cast Digital Color Imager, a Macintosh-based color printer that uses dye thermal sublimation transfer.

Color Prices Cut

QMS has knocked $4000 off the price of its ColorScript 100 Model 30 printer, bringing it down to $15,995. The 300-dpi color PostScript thermal printer can print on 8½-by-11-inch and 11-by-17-inch paper.

Racet, Jasmine at Odds

Citing dissatisfaction with Jasmine's ability to market Racet's tape and optical drives, Racet has decided to sell its Cosmos 600 Magneto Optical drive, its SA1250 DAT drive, and other products directly to the Mac market. Previously, Jasmine had exclusive U.S. distribution rights for Racet's products.

QuickMail-AppleLink Gateway

CE Software is making its QuickMail-to-AppleLink gateway available free of charge. The gateway will be posted on AppleLink and available from user groups, or direct from CE Software for a $20 handling charge.

Gateways for QuickMail and Microsoft Mail

StarNine is developing gateways from Microsoft Mail and CE Software's QuickMail to a variety of mail platforms that implement SMTP, the standard UNIX mail protocol.

Crosfield Images Mac Slides

Crosfield, a developer of high-end pre-press systems, has announced an interface for imaging slides from Aldus Persuasion, More II, Microsoft PowerPoint, VBS #5, and PICT format files on Crosfield's D148 or Captivator film recorders. The interface links PICT to Crosfield's DRAS raster format.

Microsoft-Apple Trade Cuts Adobe Out

Recent agreements between Apple Computer and Microsoft Corporation will have **a profound impact on font technology for both the Macintosh and OS/2's Presentation Manager.** Under the agreements, Apple will license a PostScript clone from Microsoft, which it plans to use in future printers. In exchange, Microsoft will license Apple's QuickDraw-based outline fonts for use in OS/2, establishing a second font standard that will force users to choose or buy fonts in both formats. Apple is developing its outline fonts as part of System 7.0; its advantage is true WYSIWYG display. In response, Adobe announced plans to publish the complete specifications for Adobe PostScript, including the proprietary curve-hinting strategy for Type 1 fonts. Adobe hopes that opening up Adobe PostScript will block Apple and Microsoft from creating a second widespread font standard. However, most Macintosh and IBM font suppliers, including Bitstream, Agfa Compugraphic, ITC, Linotype, and Monotype, have announced support for Apple and Microsoft, and Altsys plans to add the ability to create fonts with the new format to its PostScript font development tool, Fontographer.

A Storm for Any Port?

Olduvai has been showing the German HyperCard-like Plus running under OS/2. Olduvai says that Plus on the Mac can open HyperCard stacks without modification, and the OS/2 version of Plus can open Plus files that were created on a Mac, in effect **making it possible to run HyperCard applications on IBM PCs.** It is possible that SNA (Systems Network Architecture)—IBM's strategy for compatibility among mainframes, minicomputers, and microcomputers—would eventually permit Plus stacks to run on IBM mainframes.

Wingz Adds Support for CL/1

Informix is developing an add-in application for its graphic spreadsheet Wingz that **allows users to communicate directly with large databases by using SQL from inside Wingz.** The add-in supports a point-and-click interface for nonprogrammers and a programming interface for more sophisticated users. The application is written in Wingz's native HyperScript programming language and uses Apple's CL/1 implementation of SQL. The module will not be available until Apple ships CL/1, which is expected by the end of the year. Wingz lists for $395; the SQL module will cost $99 per end user and $999 for the network administrator version. For more information, contact Informix at 913/599-7100.

WordPerfect at the Office

WordPerfect Corporation is preparing a Mac implementation of WordPerfect Office. The Mac version will communicate with and match the functionality of Office on WordPerfect's other platforms. It is **a set of four desk accessories including E-mail, a calendar, a flat-file database, and a file-management utility.** The E-mail DA can look at attachments from within a message, and has a conference mode and internal support for X.400. The calendar DA provides built-in functions for searching and sorting dates and can write the results of a search out to the calendar. Pricing had not been set at press time. For more information, call WordPerfect Corporation at 801/222-5800.

Virex Blocks New Virus, Adds Full-Time Protection

At press time, HJC Software had begun shipping version 2.1.1 of Virex, which **detects and eradicates a new nVIR strain known as nFLU.** Version 2.0 of the virus-detection and -eradication utility added some new features. VirexGuard is an INIT-level watchdog that can examine floppy

(continues)

INDUSTRY NOTES

Mac Software Sales Booming

According to figures gathered by Arthur Anderson & Company, during the second quarter of 1989 Macintosh software sales increased by 22.6 percent over the same quarter of 1988 to $105.1 million. Curiously, the sales of programming languages almost doubled, while integrated packages, desktop publishing software, and recreation software declined. Mac software also increased its share of the market relative to DOS software, from 18.9 percent to 21.1 percent.

Apple Will Buy Its Own Stock

Apple Computer says that it will buy back 2.5 million of its own shares "from time to time." The company noted that the repurchase will mostly offset dilution caused by various employee stock ownership plans.

Apple Makes Huge Sale to Government

Apple has won a contract from Honeywell Federal Systems to provide from 10,000 to 80,000 Mac II–series computers to the government's Worldwide Military Command and Control System (WWMCCS). The contract is expected to bring Apple $164 million over five years.

Vendor Changes Name

The personal computer software and hardware distributor Microamerica recently changed the name of its Macintosh division from Bansu to Macamerica.

Kobe Steel Acquires Racet

Kobe Steel, of Japan, has acquired a majority of the stock of mass storage vendor Racet Computes, of Brea, California. With the backing of Kobe, Racet plans to diversify into other electronics-related areas.

NuVista Prices Fall

Truevision, of Indianapolis, cut the prices on its NuVista series of video capture and display boards for the Mac II series. A NuVista board with 4MB of RAM is now $6995, a drop in price of $1000. Smaller price cuts for NuVista boards with less RAM were also announced.

disks for known viruses as you insert them. Virex 2.0 lists for $99.95. For more information, contact HJC at 919/490-1277.

CE Software in the News

CE Software has been showing version 4.0 of DiskTop, the venerable Swiss Army knife of Macintosh utilities, as well as a new network application called In/Out. DiskTop 4.0 adds better search controls and batch operations on found files, a file-launching utility that can open more than one document at a time, and a pop-up menu showing all drives on line. It will list for $99.95 and include a copy of version 2.0 of Microlytics' Gofer. **In/Out is a network equivalent of a magnet board for leaving messages.** It does not provide a calendar for scheduling. In/Out lists for $199.95 for five users and $299.95 for ten users. For more information, contact CE Software at 515/224-1995.

Running UNIX on the Plus and SE

An Australian company has developed an implementation of POSIX for would-be UNIX users who are not in the market for a Mac II and an 80MB hard disk. MacIdris, from Whitesmiths, provides a multitasking executive, interprocess communication, and C and Pascal development tools, as well as other UNIX utilities. MacIdris runs as an application under the Finder with 1MB of memory or under MultiFinder with 2MB, and it requires only 5MB of disk space. **MacIdris runs on the Plus and all later Macs** and costs $499. For more information, contact Jean Batty at 301/657-3775.

Squeezing Typeset Quality from Laser Printers

LaserMax Systems' first two products offer **close-to-typeset-quality output from ordinary laser printers.** The LaserMax 1000 is a 1000-by-400-dpi plain-paper desktop printer selling for $7995. The MX6 series of high-speed controllers for all models of Apple's LaserWriter series generate 600-by-300 dpi output from the 300-dpi laser printers. The controllers come with 2MB, 4MB, or 6MB of memory and install in a NuBus slot on the Mac. Both products come with 35 resident Bitstream typefaces. For further information, call 612/944-9058.

14 MIPS in a Mac

Du Pont Pixel Systems, a division of E. I. Du Pont de Nemours, has announced the fastest coprocessor board to date for the Mac. The MacbRISC, a NuBus board based on a 50MHz Intergraph Clipper C300 RISC chip, offers Mac users **14 MIPS of computing power and a transparent Mac interface to the UNIX file system**. The board was scheduled to ship early next year and the price had not been finalized at press time. For more information, call Du Pont Pixel Systems at 800/225-8418.

SIMMs for Solid State Storage

Newer Technology is preparing SCSI Dart, a Mac version of DartCard, its **nonvolatile RAM disk drive** for the PC. The SCSI Dart has 16 slots for memory, providing a maximum capacity of 64MB, and may be upgraded in increments of two 256K, 1MB, or 4MB SIMMs. At press time, very tentative pricing for the unit was $995 with no memory and $1495 with 4MB. For more information, call Newer Technology at 316/685-4904.

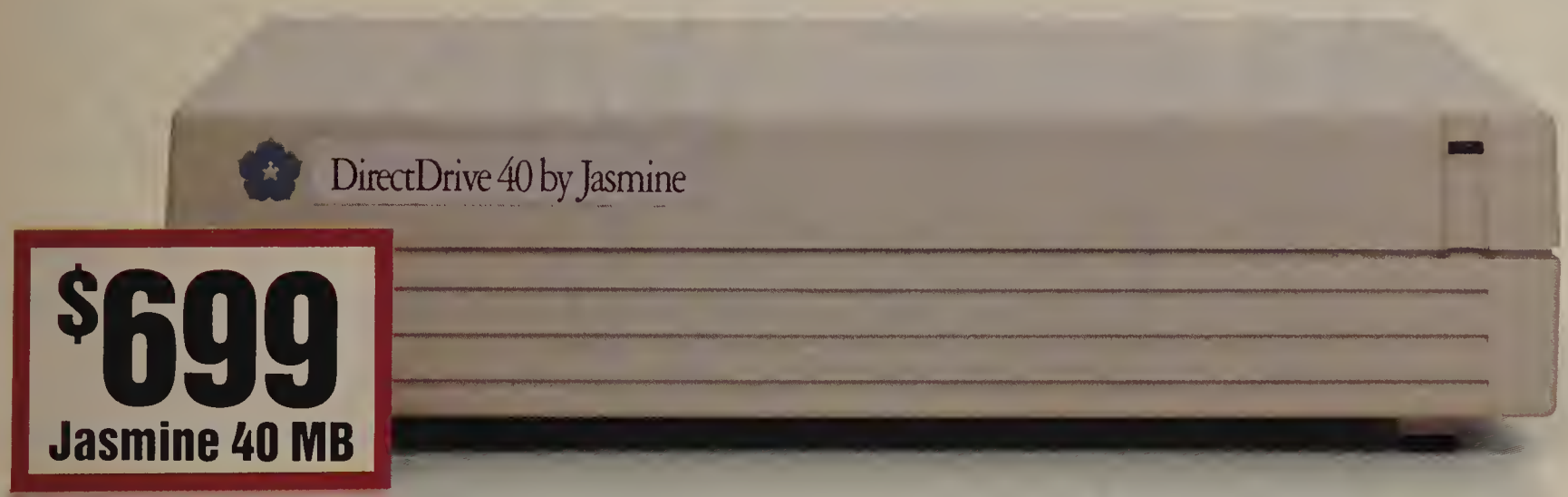
Electronic Camera Replaces Film with Floppies

Canon's $995 XapShot camera **records photos on a two-inch video floppy** and can be hooked to an inexpensive digitizer such as Digital Vision's color ComputerEyes. The images can then be treated like any digitized image. For more information, contact Canon at 516/933-6300.

When a Dot Is Not a Pixel

Canon has just introduced the first ink-jet printer for the Macintosh that creates variable-size pixels. The $4995 Full Color Printer **changes the size of pixels to produce different colors and shades.** Halftones are reproduced in the same way. The printer requires special paper and takes 8 1/2 minutes to produce one 8-by-6-inch image at a resolution of 160 dpi. For more information, contact Canon at 516/933-6300. ■

Users Won't Know The Difference.



But Buyers Will.

According to a recent article in *MacWorld Magazine*, "there is very little to distinguish one hard drive from another, other than speed, software, and price." We agree.

In terms of speed, only a very few milliseconds separate the Jasmine and the Ehman hard disk drives. Both come with excellent back-up and hard drive utility software programs included free. Both come with two-year warranties and a 30-day money back guarantee. And since both companies have been around almost since the time Macintosh was first introduced, both enjoy a reputation for manufacturing high-quality products.

That brings us to price.

As you can see, the Ehman 45 MB hard drive is $200 less than the Jasmine 40 MB. That's a difference users may not notice, but buyers certainly will.

The reasons for such a difference trace to our low Rocky Mountain overhead and a business philosophy centered around customer value and service. And now, for the first time, we're offering a 24-hour replacement program in the unlikely event that your Ehman drive should require repair.

But don't take our word on it. *MacWorld Magazine* called the Ehman drive "a real bargain." Call us today and see the difference for yourself.

Overnight delivery via Federal Express. Visa, MasterCard, American Express welcome.

HARD DRIVE PRICES

SIZE (MB)	INTERNAL	EXTERNAL
20	$329	$399
30+	$379	$449
45	$449	$499
60+	$499*	$579
80+	$579*	$649
105	$799	$899
135	$899	$999
180	$1099	$1199

Ehman

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Quality Peripherals for Added Value

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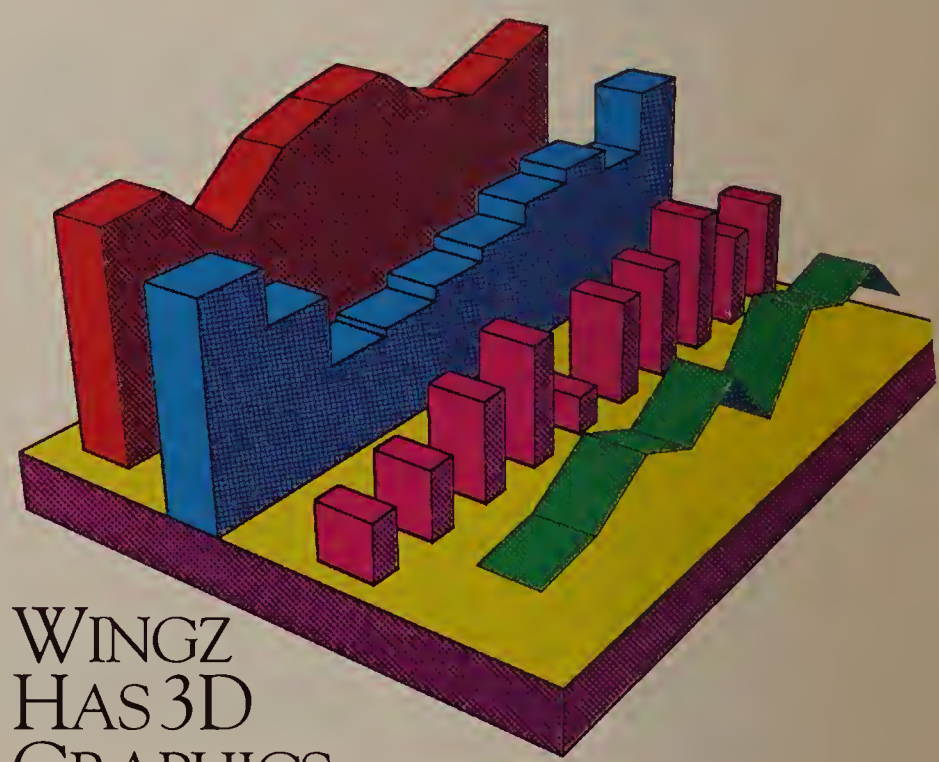
The more you work with numbers, the more you'll like working with Wingz. Wingz is the fastest, easiest way to transform your raw data into eye-catching persuasive graphic presentations. What more can we say? Wingz simply has more. Which means every other spreadsheet has less.



WINGZ HAS 3D GRAPHICS.

3D graphs make your data more understandable and more impressive.
And Wingz is the only spreadsheet with built-in 3D graphic capabilities. Wingz featues 3D bar, 3D line, 3D layer, 3D step, 3D pie and 3D combination graphs. You can change the rotation, elevation and viewing distance of your 3D graphs.

WINGZ HAS DRAWING TOOLS.

The Wingz drawing tools give your work a finished look quickly and easily, without using another software application. Choose from line, arc, circle, rectangle or polygon tools. And after you've drawn the basic shapes, you can color, size, group and move them.

WINGZ HAS UNLIMITED COLOR AND FONT SELECTIONS.

Color enhances the appearance of your data.
And Wingz maximizes your use of color. In fact, the number of color choices is limited only by your hardware.
If you have a 24 bit color system, you'll have over 16 million color choices when you enter our custom color mixing dialog box.

WINGZ HAS HYPERSCRIPT.

You don't have to be a rocket scientist to do powerful, work-saving programming in Wingz' HyperScript. (Although a lot of rocket scientists are using Wingz.) HyperScript unleashes the full power of the Macintosh.® HyperScript uses intuitive English language commands, not abstract jargon.

For example, to hide the cell grid with Excel macros would require:

=DISPLAY (false, false, true, true, 0)

To perform the same action in HyperScript:

HIDE CELL GRID

It's that simple.

WINGZ HAS BUTTONS.

Northeast	8,098	9,133	9,318
South	5,037	6,001	4,674
Midwest	9,515	8,323	8,759
South	6,976	4,898	1,306
Northwest	4,074	1,644	2,694
West	9,349	9,157	4,423
Totals	43,048	39,156	31,175

Consolidate Revenues | Consolidate Expenses
Print Revenue Report | Print Expense Report
Hide Chart | Show Chart

Buttons can make your spreadsheet as easy and natural to use as the radio or the dishwasher. They're easier and faster than menus or typing in commands. (You can also put other Macintosh controls, including radio buttons, check boxes and slide bars, directly onto the worksheet.) Just as important, buttons unleash the power of HyperScript. So you can attach lists of frequently used commands to buttons, and then execute them with the click of a mouse.

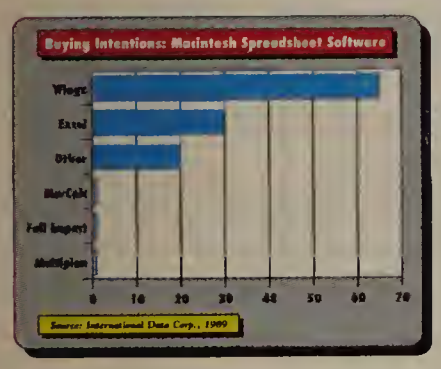
WINGZ HAS HAPPY USERS.

User Satisfaction

Rank	Spreadsheet
1	Wingz
2	Excel
3	Full Impact
4	Other
5	MacCalc
6	MultiPlan

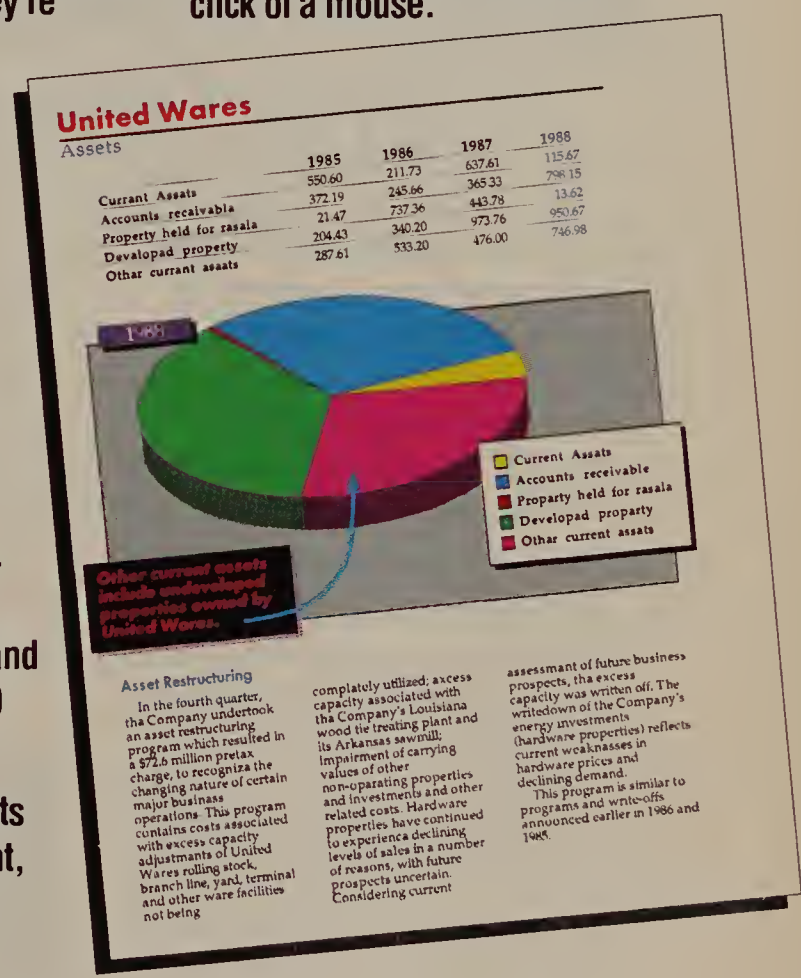
According to International Data Corporation (July, 1989) Wingz ranked number one in user satisfaction among Macintosh spreadsheet users.

WINGZ HAS FUTURE USERS.



The same survey found Wingz an eye-popping two-to-one favorite when users were asked which spreadsheet they intend to buy in the next six months.

WINGZ HAS GREAT-LOOKING OUTPUT.



In fact, all the graphics in this ad, were created with Wingz and QMS ColorScript 100 Printer.

And when your reports and graphs look great, so do you.

NOW IF WINGZ HAS ALL THIS, SHOULDN'T YOU HAVE WINGZ?

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"Cirrus Drives-the cream of the crop."

Macworld, May 1989

La Cie products are the choice of professional critics and critical professionals. But don't take our word for it, take Macworld's, MacUser's and La Cie customers. You will find that La Cie creates the standards for excellence.

"Sure winners, the lightweight, silent and inexpensive Cirrus drives from La Cie come with first-rate utility software."
Macworld, May 1989.

Cirrus drives are fast and quiet — most models boast a 1:1 interleave and 15 ms seek time. Cirrus drives are first in speed and silence in the Macworld tests. We achieve speed by pairing the finest 3-1/2" drive technology with the best software drivers available exclusively from La Cie. Cirrus is silent because La Cie uses 1/2 speed fans — found only in Cirrus drives.

"There's no benchmark test for hardware design, but the elegance and convenience of a drive — an external one in particular — should concern you."
Macworld, May 1989.

ANNUAL DESIGN REVIEW
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INDUSTRIAL DESIGN MAGAZINE

La Cie offers you mass storage solutions from 42 to 1038 megabytes. Except for the 613 and 1038, all drives weigh under 4-1/2 pounds and measure less than 3"x6"x9". These compact units don't clutter up your desk-top and do fit into our **FREE** shoulder-strapped Cordura™ carrying case or inside your briefcase for easy portability.

Capacity (Mb)	Speed (ms)	Price ($)
~~20~~ ~~30~~ 42	25	599
93	25	899
137	23	1,399
182	23	1,699
42	15	699
76	15	899
84	15	999
105	15	1,099
138	15	1,499
172	15	1,799
613	15	3,399
1038	15	5,199

"La Cie products were my favorites."
Macworld, September 1989.

All Cirrus drives include our Silverlining™ hard-disk-management software, Silverserver™ hard-disk-sharing software and DS-Backup.

"La Cie drives include the best software we tested."
Macworld, September 1989.

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Silverlining performs hard-disk management tasks like formatting, partitioning, diagnostics, password protection, defragmentation and much much more.

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Circle 145 on reader service card

Will You Buy This Portable?

Inquiring minds want to know, as Apple unveils the long-awaited luggable

by Jerry Borrell

Everyone wants to know after all of these years of waiting: Should we buy this thing? Let's look at the downside. It's expensive, it's heavy, it doesn't have color ROMs, (it can't open a lot of color programs, and it can drive a color monitor only if you set monitors to black-and-white mode in the Control Panel). Like earlier machines, the Macintosh Portable will doubtless be superseded by another more powerful model. The Portable is limited, for now, to a couple of megabytes of RAM (so MultiFinder will probably have only occasional use) and a 68000 processor for a CPU. There is 1MB on the system board, and one slot for memory expansion. And Apple recommends that only static RAM be used. This is the most expensive variety of semiconductor memory, but it's fast and requires less power. Apple will offer memory upgrades, but not at the time of announcement and shipment.

In its carrying case, the machine looks like an old-fashioned Remington portable typewriter—big and bulky. (Speaking of bulky, Apple will be the only source for the battery.) In fact, given the Portable's weight (about 16 pounds), I feel better calling the Mac Portable a luggable or a transportable. It has a trackball built in, but most of us won't want to do a lot of work with that. Jeez, can't wait—can you?

DAN ESCOBAR

TO BUY OR NOT TO BUY

So, do I want one? After some unhappiness about the computer's shortcomings hit me (and threatened my wallet) and I had time to cool off, the answer is yes. Now I'm going to spend the next several paragraphs telling you why I advocate plunking down about $6500 to buy a Macintosh Portable.

First some background. As a journalist and an editor at five computer magazines I've been using and breaking portables for longer than I care to remember. (The first thing I did to the Mac Portable shown during the product introduction was to knock it off the table onto the floor. The computer was in its carrying case and, after the gasps died down, product manager Didier Diaz opened the case, took the machine out, readjusted some loose parts, and started the machine—no problem. Impressive.)

I've used portables most people won't remember. Like the Hewlett-Packard laptop. The DOT. (DOT was a great little machine. 8086, 600 by 400, built-in thermal printer, 3½-inch drives.) The Chameleon. The Panasonic hand-held computer in a briefcase that came complete with acoustic coupler. The Osborne. The first Compaq portable. The Kaypro. And the original IBM portable. I've lugged them all, I've broken a lot of them. I found them all less than useful.

But that was the past. To be fair to readers and the market for portable computers, I needed to see what had happened to portables in recent years on the DOS side. So I visited the Computer Attic store in Palo Alto, California. I wanted a store that carried both Toshiba and Compaq portables.

The first thing I said to Computer Attic salesman Camp Peavy was, "I want to buy one of your best portables." Peavy quickly escorted me to the Compaq 386. It reminded me of an incident I'd seen a week earlier at JFK airport. This guy balanced a Compaq 386 on the edge of a seat divider, held a keyboard on his lap, and tried to read the display sideways at the same time. The thing wouldn't sit on his lap. He looked miserable. Typical DOS machine, I thought at the time.

Nevertheless, I wanted to give it a chance. "What's it got?" says I to the salesman. "Well, a 40MB hard drive; 1MB of RAM, expandable to 13MB; a 20MHz

(continues)

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80386; a 5¼-inch floppy drive; and a plasma display for $6060." My immediate reaction was pretty good. The Mac Portable is in for tough sledding. Then I stared at the screen. Could my eyes be deceiving me? The interface, with those abhorrent DOS directories, was the same as it was when I sold my IBM PC in 1986. It's still using the A> prompt. Good God, this is progress? What about all of that interface stuff I've been hearing lo these past two years about Windows and Presentation Manager?

"How long is the battery life?" I asked. "Well, sir, with the plasma display it has to be plugged in to the wall."

Then we went to look at other portables—ones that could operate on batteries. Most had LCD displays. We started with the Toshiba 80386-based family. Same deal—it used a plasma display. Now *that's portable,* I thought, spying the Toshiba 1200 on another table. "How about this one?" I asked. "Oh, the Toshiba 1200," Peavy responded. "It's got an 80268, 1MB of RAM, 3½-inch floppy drive, 20MB hard disk. Only $2000." My eyebrows went up—had I found the Macintosh Portable killer? Perhaps not. I looked at the screen. In polite terms, it was garbage. Small, hard to read, little contrast, poor keyboard.

"But if you really want a true portable with power," Peavy went on, "you should look at the new Compaq SLT." We moved back to the original table. "This machine has a 12MHz '286; 1MB of RAM, expandable to 3MB; a 40MB hard disk; a battery life of three to four hours; a slot for a math coprocessor; VGA graphics; built-in 2400-baud modem. It weighs only 14 pounds and folds up into one small package." And it did. I hefted it. Good design. Respected manufacturer. Nice. "It lists for $5125, but today I can offer it to you for $4595." I sat it up again and started looking real hard. This is the Macintosh Portable competitor (especially for anyone with a cost discount on the Apple list price). But there were those DOS directories again. And the viewing angle on the LCD screen was poor; no, it was awful. The cursor smeared as I typed. And the keyboard is junk. (Hey, I live on a keyboard, I'm picky.)

All things said, I'd rather be in Kansas with a Macintosh portable. In desperation I grabbed a copy of *Byte* off the store shelf. It had a cover article on DOS portables. Featured on the cover were the Agilis and the Zenith Minisport. The Agilis, with a chiclet keyboard and a configuration equivalent to the Macintosh Portable, would cost about $8000 (and include all the advantages of DOS). The Zenith, though cheaper, isn't available in the same configuration as the Mac Portable.

THE REAL REASON TO BUY

First of all, the Portable is a no-compromise Macintosh. When Jean-Louis Gassée said that to me, I thought, it was more product PR. In retrospect, it actually meant something. Apple could have built a cheaper, lighter, less functional machine a year ago. Instead, the company opted to make the Macintosh Portable. And if you don't understand the distinction, read the fine print about a machine like the new IBM portable. The small type informs you that due to design decisions, some programs will have problems. Okay—PixelPaint Professional and some color programs simply won't run on the Mac Portable, but it runs spreadsheets, word processors, databases, communications, games, and virtually everything else with no compromises. (Pity the poor engineers at Apple who have to revise system software and ROM for every new machine so that every application out there runs as if the new machine were designed for that application. They're the unsung heroes of the Mac world.) If you still don't get it, then you also don't mind DOS.

The Portable's screen is crisp—the best flat-panel display on a portable computer. Period. The screen is actually pleasant to use. It's big, but it also fits conveniently on an airplane tray table. Or on your lap. It's stable. It has a great keyboard. (I don't mind not being able to detach the keyboard to use it; in fact, I prefer it.) And I may not like the trackball, but if I'm on a plane, I don't want to run a mouse on my pants leg. So the trackball's convenient. And when I'm ready to add a mouse, it connects easily via the ADB port in the back.

The battery life is quoted at eight hours, due to power-saving techniques

(continues)

THE BEST 45MB REMOVABLE ON THE MARKET

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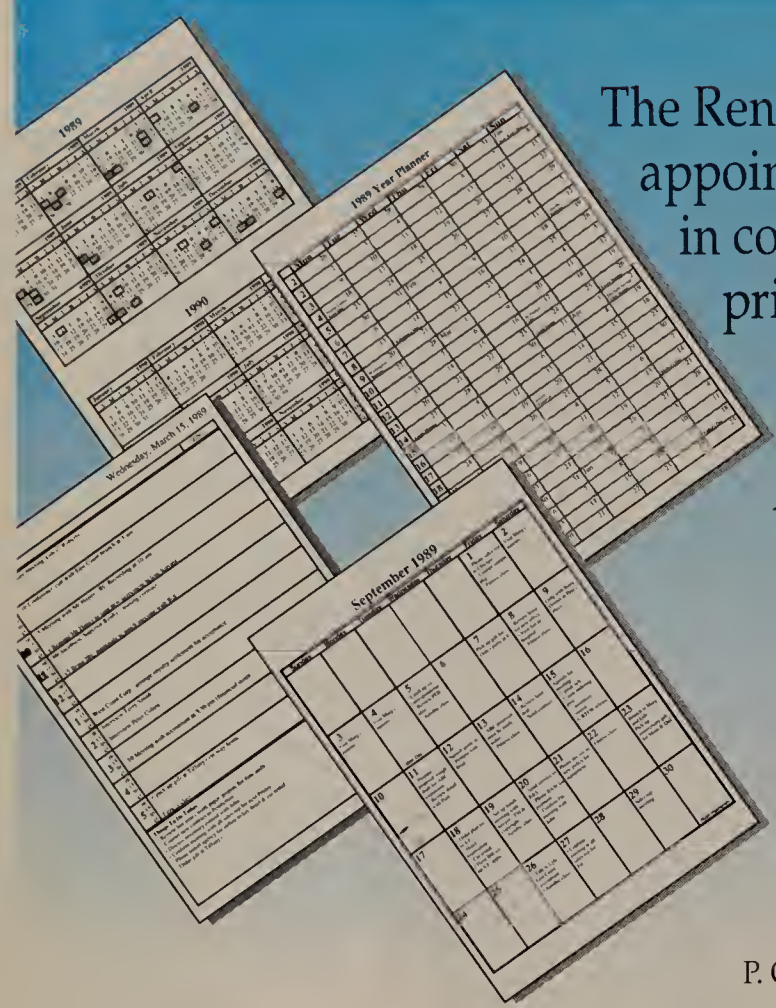

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COPY II® for Apple Macintosh ver. 7

Copy II for the Macintosh is a collection of three utility programs and a new desk accessory, Locate. Copy II combines powerful utilities which enable you to: maintain and repair your floppy and hard disks, create archival backups and allow you to install applications directly onto your hard disk.

Here is what the experts say: *"It's a well-rounded collection of useful disk utilities that no Macintosh user should be without."*
John Gillett
Macworld 5/89

and

". . . Copy II is now a utilities package whose components are powerful, useful, and, best of all, easy to use."
Jake Paden
MacUser 3/89

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SEARCH AND FIND
Locate is a fast information finder in a desk accessory. You can search for full or partial file names, up to three key words, or both. Once found, Locate displays the information and under Multifinder will launch the application.

Requirements: Mac 512e, MacPlus, Mac SE, Mac II. Supports H.F.S., M.F.S., 400K and 800K disks, 1 or 2 drives, hard disks and all available memory.

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INCORPORATED
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Beaverton, OR 97006 USA
503/690-8090

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(the hard disk shuts down, just as it does on the Compaq SLT, when not in use). I suspect that is an agressive estimate, but the battery life is longer than that of the DOS machines. (It better be—the battery is so big it looks like it could run a portable video camera as easily as the Mac.) I'll bet that the way to get a full eight hours of battery use is to run off the floppy drive most of the time. There is a little pain involved in waiting for fetches from the hard disk after it has shut down due to inactivity; it has to spin up to full speed again, but I can live with that. By the way, adding the optional 40MB drive means that you can actually carry your office with you instead of a bag load of floppies.

The internal 2400-baud modem, Apple's first internal Mac modem, is great. Now I can have my computer log on to E-mail at the home office in the middle of the night or retrieve my AppleLinks and have them waiting for me when I wake up in a hotel somewhere.

The portable is a nimble computer, more like an SE than a Mac Plus in terms of responsiveness. Like the Next machine it has the smarts to turn itself off when inactive, and it has no on/off switch. Just touch the keyboard and you start up. And for you jet-setters, there's an international power supply. Just use a plug adapter and the computer takes care of adjusting to local power.

THE LIMITATIONS OF REALITY

But why a 68000? Why no color? Reality. Motorola does not make a low-power version of the 68020 or 68030 yet—maybe next year. To produce a real Mac and make it portable, Apple was forced to build a computer with a higher-performance version of the 68000. And Apple's engineers simply could not make a 68000 do enough processing to support color graphics, especially not 32-bit QuickDraw. So we got the machine that technology allowed Apple to build.

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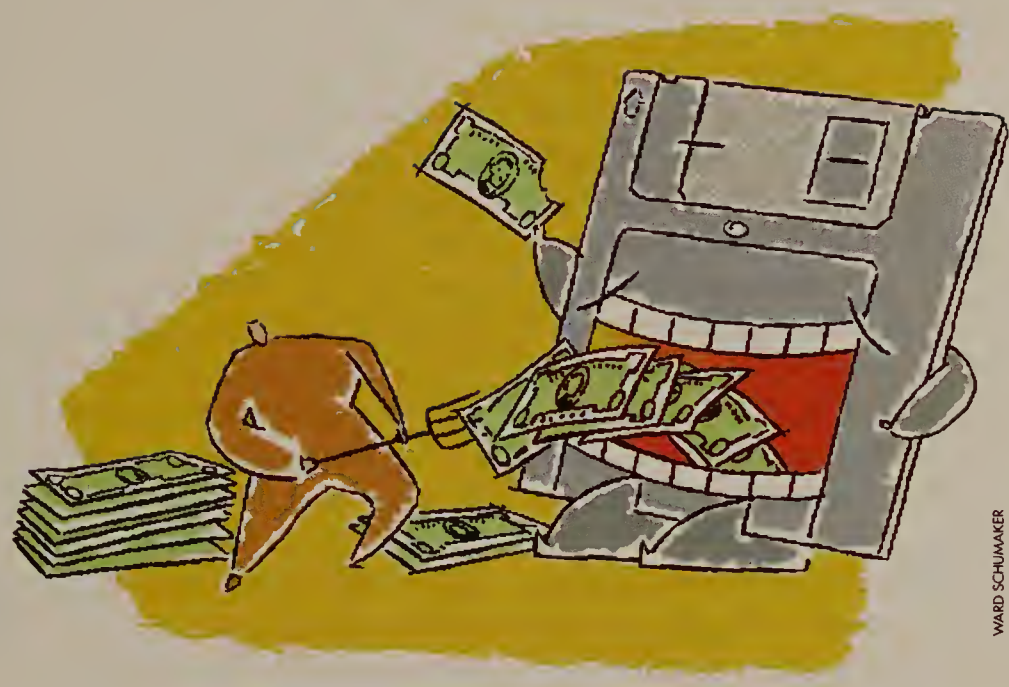

WARD SCHUMAKER

Upgrade Mania

I've been a Word/Excel/File user from the early days in 1985 and have never failed to keep current by chipping in a few bucks for the occasional upgrades. I flinched when Word 4.0 came out at $50—a substantially higher upgrade fee than ever before. But I am absolutely fuming about Excel 2.2 costing me $99! For $99, you get version 2.2, which seems only moderately better than 2.0.

In the past, a $20 to $30 upgrade fee was thought to be a moderate fee to cover Microsoft's costs and perhaps pay for a little R&D. But fees of $100 cover more than the disk they send you. Charging a $99 fee to established Excel users constitutes profiteering off Microsoft's loyal customer base.

If you like Excel and want to use the latest version, you've got no choice but to cough up $99—and brace yourself for the many $99 fees in the future. Of course, you could take my route and cut your losses. Goodbye, Excel. Hello, Wingz.

David Lange
Glenview, Illinois

DMA and the NuBus

Your article "New Life for the NuBus" [July 1989] cites DMA (direct memory access) across the NuBus as a panacea for the Mac's slow SCSI transfers. To quote from Apple's own Macintosh Technical Note #221, "The Macintosh is not real-time. The Macintosh doesn't support DMA."

Two myths are perpetuated in the article. The first is that the Mac's CPU is free to perform other tasks while another bus master is DMA-ing to its memory. Since the other master takes control of the CPU during DMA transfers, the CPU is completely incapacitated. And until Apple provides hardware support on the system board for DMA, this will not change. In addition, the NuBus specification does not provide for DMA hardware support.

The second is that other bus masters are as fast as the Mac in transferring data across the NuBus. The Mac has a 4-to-1 speed advantage over other masters on the bus. It takes the Mac 50 nanoseconds to arbitrate for the NuBus, while other masters require 200 nanoseconds. Consequently, the Mac is much faster at pulling SCSI data from a slave across the bus to the Mac's memory than another master is at pushing data into it. All in all, DMA-ing SCSI data across the NuBus to Mac memory buys very little in performance. It's unfortunate that a powerful technology, like DMA, gets hailed by some manufacturers as the ultimate solution to every performance problem regardless of the specific situation. And unfortunately for the user, such behavior perpetuates the myth that any new technology offers a universal cure to all performance shortcomings.

Finally, FirePower, our 68020 Macintosh Applications Platform, was listed in the wrong category. It should be listed under coprocessors.

Marsha Moraes
Golden Triangle
San Diego, California

Corrections

The phone number for Bantam Electronic Publishing (New Products, *June 1989) is 800/223-6834, ext. 9479 (212/492-9479 in New York City).*

The correct phone number for the Boston Computer Society Macintosh User Group ("User Group Directory," September 1989) is 617/625-7080.

The phone number for MacTwain ("User Group Directory," September 1989) is 209/533-1993.

The correct phone number for the Chippewa Falls Macintosh Users Group ("User Group Directory," September 1989) is 715/726-2100.

The bug in QuarkXPress that caused irregular spacing in justified italic text was fixed in version 2.1 (Letters, *September 1989). QuarkXPress 2.1 also has a graphics search-and-replace feature that allows you to update or relink graphics to a document.*

PLI's Disk Drives

Several things have changed at PLI since the article "Hard Disk Alternatives" [July 1989] was written. One statement was somewhat misleading as well.

PLI has discontinued production of its 10MB floppy

(continues)

disk, the Infinity 10, and has begun shipping the Turbo Floppy 1.4, an external 1.4MB floppy disk upgrade for the Mac Plus and greater. PLI is also introducing the Infinity Optical drive, a rewritable magneto-optical drive.

The section about 45MB removable hard drives states that "drive utilities from larger vendors (Jasmine, Mass Microsystems, and Peripheral Land, for example) are often worth several hundred dollars on their own." The problem with this statement is that Jasmine does not offer a 45MB removable, and Mass Microsystems ships only a partitioning program. On the other hand, Peripheral Land (or PLI, as it is now known) bundles its Turboware utilities—which would cost $436 purchased separately—with the Infinity 40 Turbo.

Tad Shelby
PLI
Fremont, California

Guarding Against Surges

I've just read Thom Hogan's column "Keep Your Mac Healthy" [*State of the Mac,* July 1989]. I've been installing and maintaining electrical and data lines for five years and have a few prescriptions for avoiding power-related problems.

First, a hard-wired receptacle that replaces an existing wall outlet has a higher level of protection than a protected outlet strip or some other plug-in device. Also, the farther away you install surge arresters from your breaker or fuse box, the better they work.

Since surge protectors do not protect against lightning, avoid using your computer during an electrical storm. If you must stay online, invest in a lightning arrester. You can expect to spend at least $450 for a unit that can handle an average residential service.

Computers and peripherals should be connected to grounded outlets. Don't assume that equipment is grounded because you've used a receptacle with a third prong for grounding. Have an electrician check it or get an outlet tester. If you use an extension cord, make sure it's a three-wire cord. Never use a three-prong to two-prong adapter.

If possible, install a dedicated circuit for your computer and avoid running this wire parallel to other wires. If you must use a nondedicated line, have an electrician check to make sure this circuit is not sharing its neutral (white) wire with another circuit.

Static electricity can be as damaging as a surge. Use a static-reducing spray and install a static mat under your chair.

If you have a modem, invest in a surge arrester for communications equipment. Finally, when cabling a printer or LAN, avoid running the wires parallel to power lines.

Thomas Ogryski
Shinnston, West Virginia

Healthy Skepticism

Keep Your Mac Healthy" was in the right spirit, but it was poorly executed and

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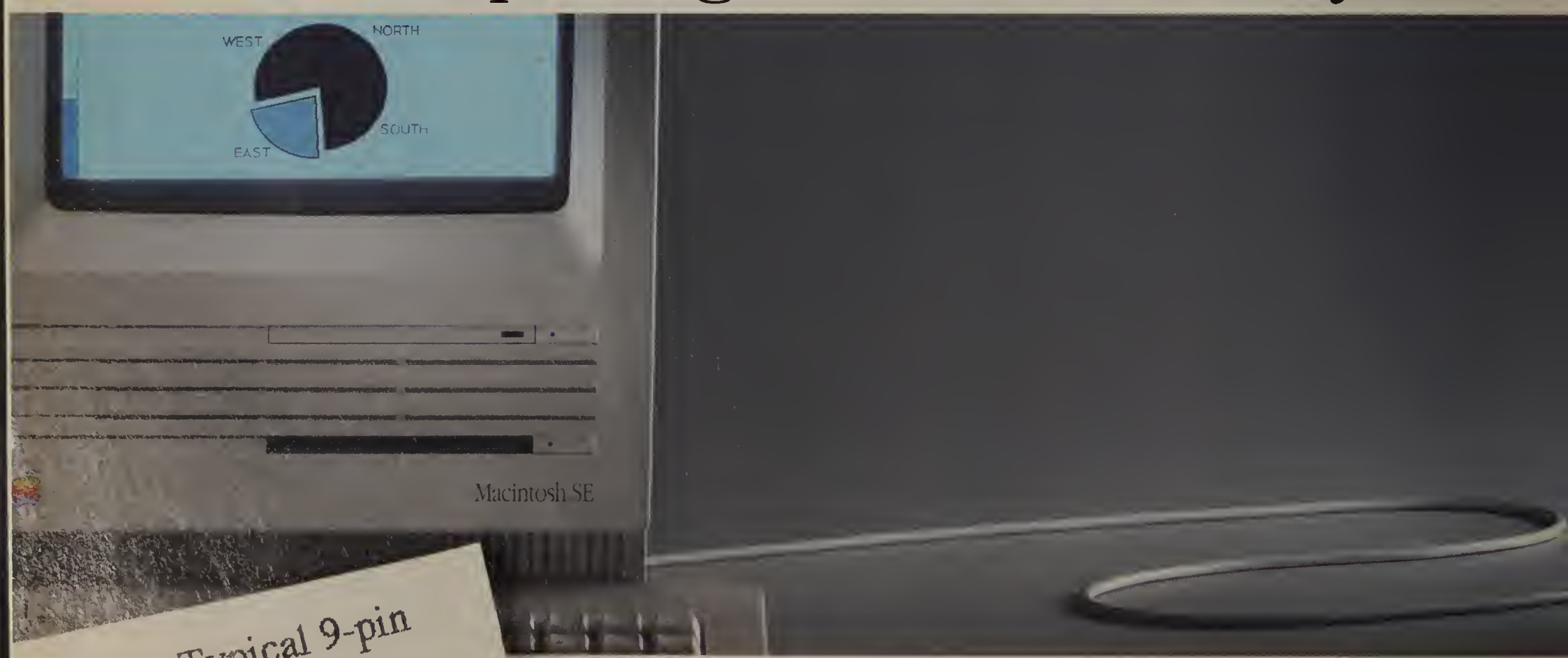

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full of misinformation. First, the article suggested that you should leave a hard disk on as much as possible to keep dust off the spinning platter. The hard disk media is in a sealed module through which no air flows. The idea of dust getting in is ludicrous and is certainly no reason to leave a hard disk on continuously (which means you've thrown away many hours of useful life).

Then you overlook the actual reason smoke and dust are so dangerous to floppies. Ash and dust particles small enough to travel in the air are highly abrasive; your heads and media will be scratched into oblivion long before any mythical layer can build up thick enough to block the signal.

And what's this about lightning jumping cables to get to a disconnected computer? Electricity follows the path of least resistance to ground. No ground, no path. Yet you leave the impression that there's nothing we can do, and even disconnected equipment is vulnerable to the whims of nature.

One moment you're telling us not to vacuum our equipment because we might damage something, and the next you're saying we should open the Mac and use a pencil eraser to clean the contacts on the SIMMs. Scratching through the gold plate on the contacts with an eraser guarantees oxidation and future problems. Why not contact cleaner and a soft cloth?

And what about discharging the CRT first? It can keep a lethal charge for days. Advising anyone who doesn't know any better to poke around inside a Mac is foolish and demonstrates reckless disregard. Why no warning?

Frank Jaubert
Houston, Texas

You shouldn't open a Mac Plus or an SE and meddle with its innards—unless you know how to discharge the CRT safely. See the Apple Service: Technical Procedures, Macintosh Family *manual for details. Disconnecting just the Mac from wall sockets may not be enough to guard against lightning, because spikes can come into a computer through other equipment (such as a modem or printer) that is still connected.*

Although contact cleaner may be preferable for cleaning board edges, most engineers use erasers because they're handier. With reasonable care (gently lift off the dirt, don't abrade the contacts), it should work fine.—Ed.

Lasergraphics Film Recorder

From Screen to Slide" [July 1989] deserves much credit for its fairness, but we must clarify and correct some information.

The first involves the missing lines from the Canvas sailboat image you tested, which contained requests for unrealistically thin lines. Since our MacRascol software was designed to grant all image requests, it tried to draw these lines, which were so thin as to be invisible. The other film recorders did not obey these image requests, and so did not actually image the boat literally. The new version of MacRascol (1.04) now provides a minimum line-width check that converts such lines

(continues)

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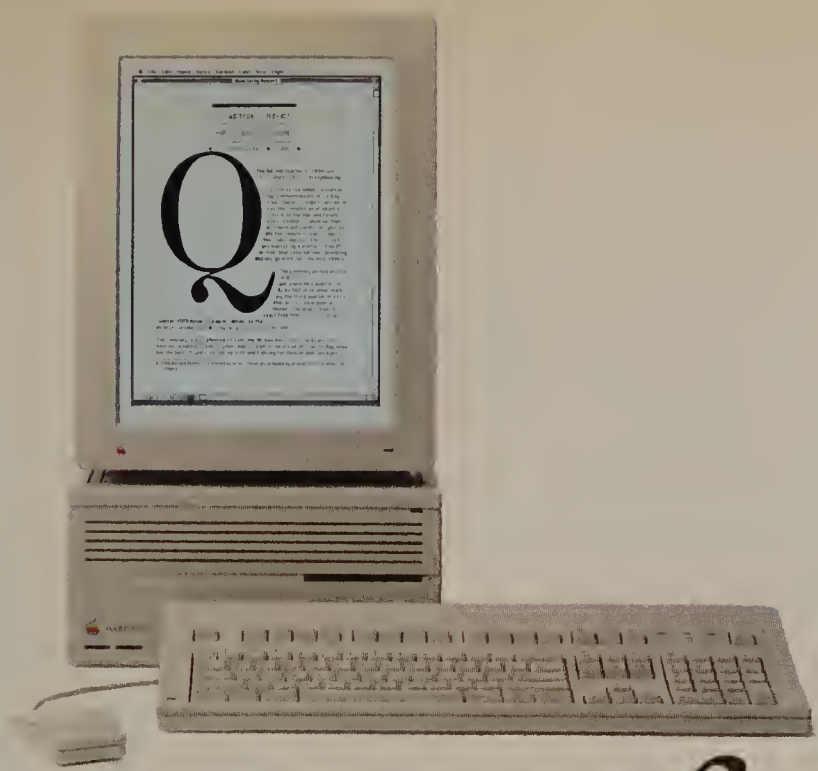

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to the minimum visible width.

The Lasergraphics film recorder was incorrectly described as having a spot size of 1.7 millimeters. The spot size is actually 1.7 mils (a mil is 1/1000 inch), which is 0.043 millimeters.

We now ship our film recorder with a 1.5-amp fuse to prevent the blown fuse caused by turning the recorder on and off too quickly.

Tracey Farr Hannel
Lasergraphics
Irvine, California

Baud versus BPS

In the sidebar "Data Carriers" in your article "Communicating at Speed" [July 1989], you correctly state that "baud is the same as bps (bits per second) only if each signal . . . represents one bit." However, you also say that in general, beyond 3000 baud, modems start to use more than 1 bit per baud.

I was under the impression that this occurs at 600 baud, meaning 1200-baud full-duplex modems use two 600-baud channels with each channel using 2 bits per baud, and 2400-baud modems also use two 600-baud channels, but with each running at 4 bits per baud (one baud being a signal; 2 bits per baud means four distinct tones: one for 00, one for 01, one for 10, and one for 11). Four bits per baud implies 16 tones, currently accepted as the most an average phone line can handle; otherwise, 9600 baud wouldn't be a problem: just use 16 bits per baud, or 256 different signals. You seem to be saying that 1200- and 2400-bps modems use 1200- and 2400-baud carriers, respectively, while both actually use 600-baud carriers.

Steve Ihde
Chevy Chase, Maryland

Although modems can use single-bit representations on voice lines up to 3000 baud, many modems instead employ data compression at speeds below 3000 baud. Both 1200- and 2400-baud modems use a 600-baud carrier and some data compression scheme.—Ed.

High-Speed Compatibility

To correct your story on high-speed modems ["Communicating at Speed," July 1989]: our Courier HST modem's high-speed channel operates at speeds of 14,400; 12,000; 9600; 7200; or 4800 (depending on phone line conditions); its low-speed reverse channel operates at 450 bps, as specified in the proposed V.34 standard.

Mark Smith
U.S. Robotics
Skokie, Illinois

Memorybank Mass Storage

We'd like to make a couple of corrections to your review of our Memorybank mass storage subsystem [*Reviews*, July 1989]. First, to change backup parameters, click the Edit button and edit the original backup list. You don't have to "define a whole new set." Second, a single file can be restored easily under the file/folder backup methodology.

Prudence F. Heikkinen
Northern Telecom
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Imagine the Chinese ambassador wants to ask the Brazilian ambassador across the table to please pass the salt.

Unfortunately, he doesn't speak Portuguese.

But he does speak Malay. So he asks the Malaysian ambassador (who speaks Dutch) to ask the Dutch ambassador (who speaks French) to ask the French ambassador (who does speak Portuguese) to give him the message.

Sounds ridiculous, doesn't it?

Yet it's the way many people still go about producing a document.

Different people create text and graphics using different systems, with different output devices. Sometimes these devices are compatible. Often they aren't.

And, putting the whole thing together—setting type, scanning in images, page layout—involves many different systems and a lot of time-consuming work. It's a complicated process full of bottlenecks—and no common language.

Which is why Adobe Systems created the PostScript language.

POSTSCRIPT LANGUAGE TO THE RESCUE.

PostScript really isn't complicated at all. It's a standard language computers can use for communicating visual information.

PostScript acts as a common interpreter among many different computer systems and output devices that create images by laying down a pattern of dots. It's a transparent language—that is, you don't have to learn it to put it to use. (The computers and peripherals use it.)

Your application automatically "writes" a general code into your document which any PostScript interpreter can "read." The interpreter tells the output device specifically how the document should look, optimizing that device's special features. (PostScript is a common page description language, but each device has its own interpreter.)

A SINGLE LANGUAGE THAT UNDERSTANDS MANY LANGUAGES.

Once you create a job file with a PostScript software application, you can output it on any PostScript device you choose—plain-paper printer, laser imagesetter, even a slide maker.

Adobe calls this "device-independence", and it's a large reason why the PostScript language became the industry's standard page description language.

Over 40 different PostScript output devices are on the market today,

TAND POSTSCRIPT, AT THE U.N."

ranging from 300 dots-per-inch (dpi) plain-paper printers to 2,400-dpi laser imagesetters, to slide-making film recorders.

Over 4,000 software applications support PostScript—page layout programs, graphics and drawing programs, word processing programs, even spreadsheets. The roster of computer and graphic arts companies supporting PostScript includes AGFA Compugraphic, Apple Computer, IBM, NeXT Inc., and Digital Equipment Corporation, to name just a few.

A NEW WAY TO SHARE IDEAS.

There's another benefit to using PostScript products—different people can share jobs.

Say you want to create a document with both text and graphics. You lay out the page using Aldus PageMaker®. Your designer creates an illustration using Adobe Illustrator 88™. Because both are PostScript language applications, you can move the illustration directly into the page-layout file. You've just created a single job file using two different applications—and one common page description language.

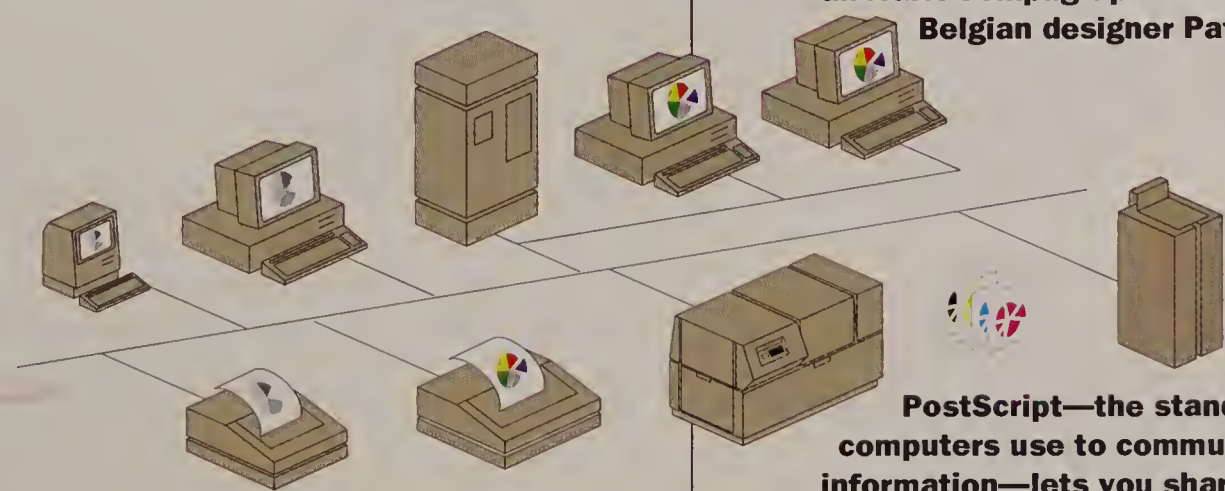
You can transfer these files by exchanging floppy disks, or over local area networks like TOPS® or AppleTalk®. And because PostScript language files are standard ASCII files, you can send your information around town or around the globe, using standard telephone circuits.

IT'S THE OUTPUT THAT REALLY COUNTS.

Ultimately, all of this boils down to one thing—the quality of output you get on a page. The PostScript language first became a standard with designers because, as you're about to see, its creators understood as much about typography and design as they did about programming.

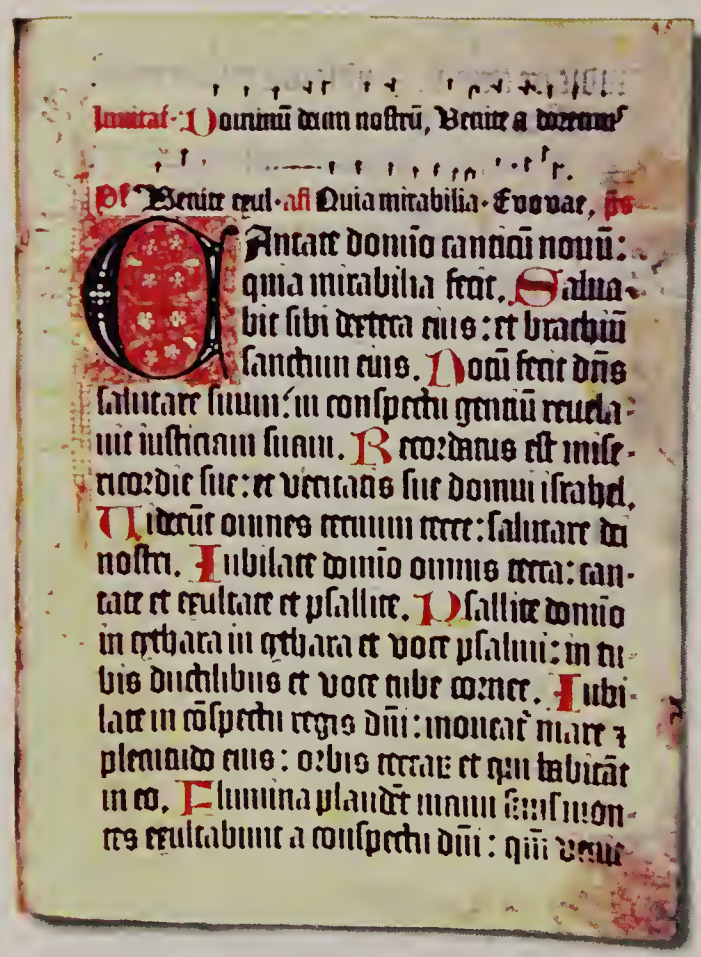
You'll find this logo on over 40 different output devices—plain-paper laser printers, laser imagesetters, even slide-making film recorders—and on over 4,000 software packages.

The PostScript language's type and graphics capabilities bring design to your desktop. This poster was produced on a Macintosh and output on an AGFA Compugraphic 9400-PS by Belgian designer Patrick Gypen.



PostScript—the standard language computers use to communicate visual information—lets you share jobs among your different computer systems and output devices.

"RIGHT NOW WE
GUTENBERG WAS IN



The Fust and Schoeffer Psalter, 1458—the first book printed in color. Gutenberg's associates showed that movable type, like PostScript, wasn't just a passing fad.

Just five years after Johannes Gutenberg and his associates published their Mainz bible—the first modern printed book—they printed the psalter you see to the left.

In color.

While others believed movable type was a passing fad of limited use, Gutenberg's associates proved its possibilities were far wider.

If you follow desktop publishing this may sound familiar. Five years ago, Adobe introduced the PostScript language, Apple introduced the Macintosh® and LaserWriter®, and Aldus introduced PageMaker.

Desktop publishing was born.

Today, you pick up a trade magazine and everyone's talking about color. Or "electronic publishing." Some have even asked, "What comes after PostScript?"

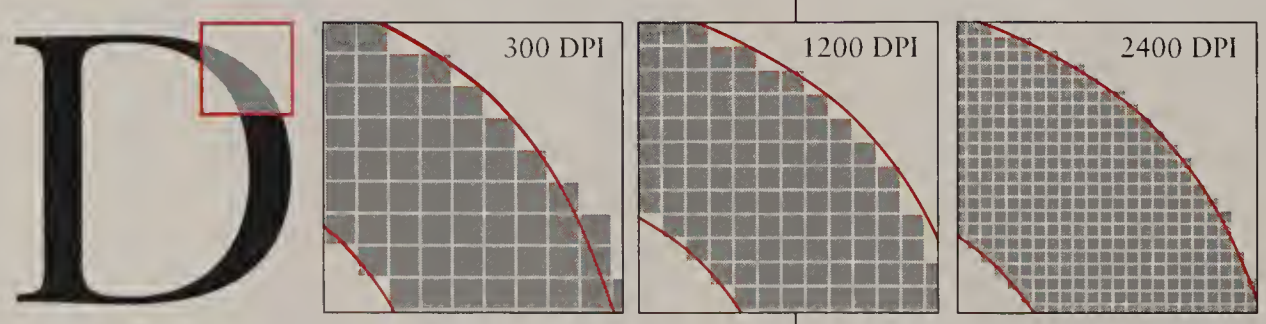
To us, the last question seems a bit odd. Because, like movable type in Gutenberg's era, the design possibilities of the PostScript language are still in their infancy.

OUTLINE FONTS AND HINTED TYPE.

"Type," as one of our colleagues put it, "is the blood that runs through any publishing system."

Before PostScript, type from personal computers was pretty weak—unrefined bitmaps that couldn't print clearly at small point sizes. Characters defined by short, straight vectors that didn't appear smooth, especially at higher resolutions.

The PostScript language, on the other hand, uses precise mathematical outlines called Bezier curves to define characters. The curves make sure the rounded parts of your letters are properly rounded. The outlines let you choose different resolutions, because each output device "fills" the outline with its own pattern of dots.



The higher the resolution, the sharper the type, of course. So it's important to specify whether you want final output from a laser printer or an imagesetter like the AGFA Compugraphic 9400-PS.

And to help characters keep their character at low resolutions, Adobe adds special hints to its PostScript fonts. These hints, "read" by Adobe PostScript interpreters, preserve the most important typographic features, such as equal stem weights and uniform serifs. (Of course, the type isn't exactly the same, because a 2,400-dpi imagesetter actually has sixty-four times the resolution of a 300-dpi laser printer.)

POSTSCRIPT TYPOGRAPHY.

Hinting is an Abobe PostScript language exclusive. But it's not the

RE ABOUT WHERE
458."

PostScript language's only contribution to computer-generated typography.

Today, most PostScript page layout applications offer professional kerning and leading capabilities. You can space letters (kerning) and lines (leading) as you wish, on your own computer, proof the results on a laser printer, then output the final copy on a laser imagesetter.

Before the PostScript language, only proprietary typesetting systems offered these features. The systems weren't compatible with other computers, so all text—from headlines to entire books—had to be re-entered by the typographer.

With PostScript, if things don't come out right the first time, you make the changes yourself, instead of telling someone else what you'd like done. Chances are, this alone will eliminate a round or two of proofing.

DESIGNED WITH DESIGN IN MIND.

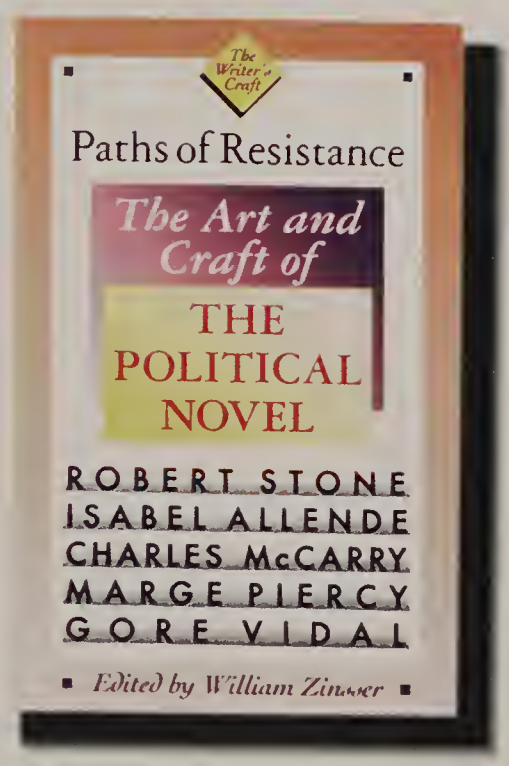
PostScript lets designers do other things they couldn't do before, too, such as rotate text, fill outline letters with patterns, and shadow letters. And it's easier to make type colorful, because color specification was included in the PostScript language right from the start.

Today, designers create letterheads, books, posters, and ads with PostScript type, such as the book jacket to the right. Designer Ronn Campisi combined AgfaType Professional™ Series Garamond 3™ and Futura®, both hinted Adobe fonts, with AgfaType Studio™ Series Collage Italic, an unhinted user-defined font.

The faces were sized to fit, shaded, and color-specified. The result was a unique design created on a computer instead of a drawing board.

(User-defined fonts, incidentally, feature accessible character outlines that let you customize typefaces for logos, designs and headlines. Because they're unhinted typefaces, our Studio Series fonts are ideal for high-resolution output.)

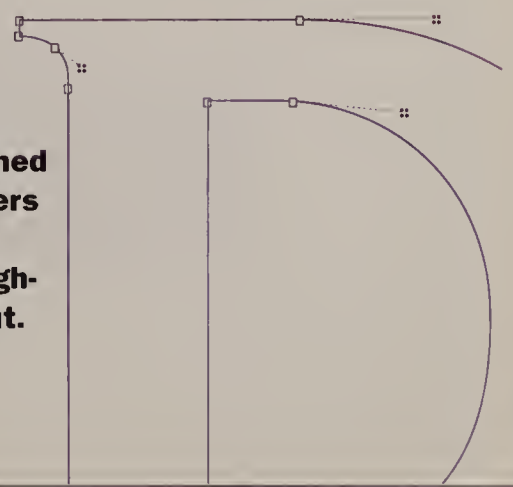
With over 575 PostScript typefaces on the market today, there's a lot more we could say about type. But the PostScript language isn't just a type language. It's a text and graphics language. And these days, designers are doing things with PostScript language graphics we think you'll have to see to believe.



Designer Ronn Campisi created this book jacket using AgfaType Professional and Studio Series fonts. The type was sized to fit and output in the specified colors.

You can choose type from many different vendors. Agfa and Adobe together offer over 575 fonts, from classics like Sabon to the ITC Franklin Gothic® you're reading now.

The accessible outlines of AgfaType Studio Series user-defined fonts let designers create unique typefaces for high-resolution output.



"I HAVE THE FEEI KANSAS ANYMORE."

Color came to the movies 50 years ago. Agfa PostScript products are bringing it to desktop publishing today.

Do-it-yourself pre-press. Proofs of the image above, separated on a Macintosh with Adobe Separator, and output as films on an AGFA Compugraphic 9400-PS.

Fifty years ago, Dorothy walked through a black-and-white doorway and into a world of color.

Today, the same thing is happening on our desktops. Color monitors are selling faster than monochrome monitors, and new color editing and separation software appears almost every month.

At the output end, things are changing, too. There are color PostScript printers, which are good for making a few prints, or proofs, at a time. Desktop color has come to slide presentations as well, and even to electronic publishing.

Today, it's possible to create a document at your desktop, or at several desktops, with color images, and prepare and output the separated films for platemaking without leaving the PostScript language format!

THE DAWN OF "DESKTOP COLOR."

For many applications, you can control the entire pre-press process, from concept up to the final printing itself. And you'll save time, too, because you won't have to wait for the typesetting and color separations you now send out for.

What does this "desktop color" system look like? Basically, you need an Apple Macintosh with a hard disk and a good color monitor, a scanner (gray-scale or color), a laser printer (regular or color), color software, and an imagesetter. AGFA Compugraphic offers this type of system with its Macintosh-based professional publishing systems.

You compose pages using PostScript applications, combining text, images, and graphics. You can pull your proofs using a plain-paper laser printer such as the AGFA P3400 PS, or a color PostScript printer.

If your final output doesn't have to be of the highest resolution (an in-house newsletter, for example), you can do the color scanning and photo editing yourself with a low-resolution color scanner and editing software.

For highest-quality work, it's best to scan your images for position only with a gray-scale scanner like the AGFA Focus S800 GSE. Then send them to a color service bureau, along with your job file. The service bureau performs high-quality scans and separations using a professional color scanner (which, for the moment, is above the "desktop" price range), then merges the scanned images with your job file for final output.

You can now output the series of four registered films—cyan, yellow, magenta, and black—used for process-color printing with a PostScript

NG WE'RE NOT IN

imagesetter like the CG 9600-PS, which is specially calibrated to keep all four films in register.

A POSTSCRIPT PRODUCTS SLIDE SHOW.

PostScript products and desktop color can enhance your presentations, too. Instead of text-only slides in simple block letters, you can produce professional slides that combine text, graphics and images.

You'll need a Macintosh (or PC) with color monitor, color scanner, page layout and color software, and the new AGFA Matrix PostScript film recorder—the industry's first—to set up a slide-making service bureau in-house. You create and scan images as needed, combine them into the final image, then output the image to the film recorder.

© 1989 Rick Smolan

Now, with the AGFA Matrix PostScript film recorder, you can create full-color slide presentations at your desktop. Take one photo of a hat, scan it, and add backgrounds, patterns, and type fonts.

Consider the slide on the right. The hat was photographed as a 35mm color slide. This slide was scanned, a color halftone created, and the new image saved as a PostScript language file.

The line art and special text effects like shadowing were created using Adobe Illustrator 88. The background patterns were selected from the Adobe Collector's Edition: Patterns and Textures.

The designer combined the color halftone with the image to complete the file. The final image was produced on the new AGFA Matrix film recorder.

Because the entire process uses the PostScript language, the text and graphics reproduce on the slide with the same clarity of a printed piece. Instead of presentations where everyone sits reading what you've just said, you'll have them waiting to see what comes next.

Some of the common PostScript applications used on a Macintosh to create the final slide below.

WHAT COMES NEXT?

The technology you've just read about is state-of-the-art, but it's by no means complete. At AGFA Compugraphic, finding new ways to combine color and PostScript is our goal. Our new enhanced CG 9600-PS imagesetter is but one example.

In future months, we'll have more color ideas to share with you. In the meantime, the next spread may give you a better idea of what you can do right now.

The finished slide. The AGFA Matrix film recorder lets you easily add existing PostScript artwork, and the full range of PostScript type, to your presentations.

"And Now, AGFA Would Like To Give

All of the type, electronic art and most of the color halftones in this advertisement were produced on an Apple Macintosh, and output on AGFA Compugraphic PostScript imagesetters. One result: the designer has more control over page layout.

AGFA Compugraphic offers the broadest range of PostScript output devices—plain-paper laser printers, scanners, laser imagesetters, and the industry's first PostScript film recorder.

Take these two pages, for starters.

And the previous six.

Agfa products and the PostScript language let us produce the text, graphics, *and* color separations on these pages electronically with a single system, instead of the many systems commonly used.

And because the PostScript language supports file transfer by phone or disk, we could work with people and facilities across the country.

In New York, the art director and a designer laid out the pages using Aldus PageMaker and QuarkXPress®. Illustrators in New York and California created electronic art using Adobe Illustrator 88 and AgfaType. Another illustrator sat down and wrote "Please pass the salt" in Chinese.

In Connecticut, the copywriter sent the text by modem to the designer in New York. The art director and the designer put the pages together on a Macintosh, scanning in graphics with an AGFA Focus S800 GS gray-scale scanner.

After pulling proofs on an AGFA P3400-PS printer, they separated the photographs using Adobe PhotoShop™ imaging technology software. The final separated films were output on an enhanced CG 9600-PS imagesetter at 2,400 dpi. Only the full-bleed photographs were reproduced conventionally.

TWO DIFFERENT COMPANIES, ONE COMMON GOAL.

This advertisement is truly state-of-the-art, but it was produced with unmodified, affordable equipment. The point is, with the same equipment, you could do the same quality work today.

And by choosing PostScript equipment, you're choosing an industry standard that will continue to grow. Adobe Systems Incorporated is committed to keeping PostScript "the standard way computers communicate visual information."

To back that commitment, AGFA Compugraphic offers the broadest range of PostScript type and output devices on the market today.

A FAMILY OF POSTSCRIPT SOLUTIONS.

We've been in the graphic communications business for 29 years, so our products are designed with the needs of typographers, designers, printers,

AGFA, Compugraphic and the AGFA rhombus are registered trademarks and AgfaType, Professional Series and Studio Series are trademarks of Agfa Corporation. Adobe and POSTSCRIPT are registered trademarks and Adobe
QMS is a registered trademark and ColorScript is a trademark of QMS, Inc. XPress is a registered trademark of Quark, Inc. TOPS is a registered trademark of Sun Microsystems, Inc. Franklin Gothic is

COMPUGRAPHIC
YOU A DEMO."

ad agencies, and corporate operators in mind.

Our family of laser imagesetters—the CG 9400, 9600, and 9700-PS—all produce 2,400 dpi output for text, graphics, and color separations. They also offer better throughput, thanks to our new, faster Adobe RIP (raster image processor).

Our P3400 PS laser printer offers 400-dpi resolution combined with the twelve-pages-per-minute output of a departmental printer. Our AGFA Focus scanners and image-editing software let you add and alter graphics at up to 800 dpi.

Our sister division, AGFA Matrix, offers the industry's only PostScript film recorder. And our AgfaType collection currently offers 575 fonts. With a library of over 1,700 typefaces to draw on, we plan to offer many more soon.

Behind all of these products are over 400 service engineers and product applications specialists who understand not only our products, but your business, too. And we offer a full line of AGFA Compugraphic phototypesetting materials and processing equipment.

QUESTIONS, ANYONE?

If you'd like to know more about the PostScript language, or the AGFA Compugraphic family of PostScript solutions, please return the attached reply card or give us a call at 1-800-227-2780 (in Canada 1-800-387-9533).

We'll send you a set of free booklets on PostScript and the future of electronic publishing, written by the same Agfa and Adobe people who spoke at our seminars.

Thanks for taking the time to read through. The next time we get together to talk, we'll be sure to send you an invitation.

Backing AGFA Compugraphic's products is a full line of supplies and the industry's largest service and support team—*five times* the size of our closest competitor.

Applications like these and AGFA Compugraphic products were used to create this brochure. The common PostScript language made it possible.

Want to know more? Send for a free set of booklets discussing the future of page description languages, type, and PostScript technology.

PRODUCTION NOTES

This advertisement was created by Anderson & Lembke, Stamford, CT, with production assistance from Burns, Connacher & Waldron and MicroColor, New York, and Digital Pre-Press International, San Francisco. Page layouts were produced with Aldus PageMaker and QuarkXPress, using a Macintosh II and an AGFA Focus S800 GS scanner. Proofs created with AGFA P3400 PS and QMS ColorScript™ laser printers. Images scanned at 1K resolution, and color separations created with Adobe PhotoShop imaging technology software and output on a CG 9600-PS imagesetter.

Chinese characters courtesy of Dan Michaels. Fust and Schoeffer Psalter courtesy of the Scheide Library, Princeton University Library. Photography by Nora Scarlett, New York. Printed by the Bradley Printing Company, Chicago, on a Harris 1000A full web press.

trator 88 and PhotoShop are trademarks of Adobe Systems Inc. PageMaker and FreeHand are registered trademarks of Aldus Corporation. Macintosh is a registered trademark and LaserWriter is a trademark of Apple Computer, Inc. gistered trademark of International Typeface Corporation. Futura is a registered trademark of Fundición Tipográfica Neufville S.A. Garamond 3 is a trademark of Linotype AG and/or its subsidiaries.

THANKS FOR COMING.

AGFA

AGFA COMPUGRAPHIC DIVISION

I ENJOYED YOUR SEMINAR. I'D LIKE TO KNOW MORE.

- ❑ I'm very interested in your family of PostScript® solutions. Please have an AGFA Compugraphic representative contact me.
- ❑ Please send me more information about your
  - __ PostScript laser imagesetters.
  - __ PostScript plain-paper laser printers and scanners.
  - __ AGFA Matrix PostScript film recorder.
- ❑ Please send me
  - __ Your free set of booklets on PostScript and the future of electronic publishing.
  - __ Additional copies of this advertisement.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

Phone _____

AGFA

AGFA COMPUGRAPHIC DIVISION

Clash of the Titans

Four months of glowing praise and rave reviews for Microsoft Word 4.0 and no one bothered to mention that PageMaker can't place its files.

Gary B. Mohr
Bar Harbor, Maine

PageMaker was unable to place Word 4.0 files because the new version of Word was still in development when the current version of PageMaker was released. As we reported in Mac Bulletin *(September 1989), a $25 upgrade to PageMaker 3.02 lets you place documents from Word 4.0 and lets you place and edit tables created with Word's new table features.—Ed.*

The Insurer Speaks Out

Thank you for helping to remind people not to take everything for granted when considering the protection of their investment in computer equipment ["Protecting Your Investment," *Conspicuous Consumer*, July 1989].

The homeowners' and renters' policies of the Farmers Insurance Group of Companies in California specifically exempt computers and software from the category of business property. So your use of the computer is not considered in the event of a loss.

Safeware is not an insurance company per se. The policy protecting computers is underwritten by Central National Insurance Company, at least in California. Farmers covers them under the policy as any other unscheduled personal property, that is, no inventory is required for the coverage to be effective.

I also object vehemently to your statement, "As a good Californian, I hate insurance companies." While insurance company–bashing is popular now, to characterize it as the duty of "a good Californian" is inflammatory and in poor taste.

Dale A. Dimas
Cupertino, California

Virtual Memory

Jerry Borrell's *Commentary* in the July issue provided a good overview of the ramifications of the new features Apple recently announced for System 7.0. However, there was one small problem with his mention of virtual memory, which he says is "crucial to Apple's commitment to retain a low-cost CPU that will run with only 1MB of main memory." Unfortunately, Apple's implementation of virtual memory is not intended to run under 1MB of RAM but will require 2MB.

The virtual memory software from Connectix, Virtual, works fine with only 1MB of physical memory, and version 1.05 even provides a 20 to 25 percent increase in speed on a 1MB machine.

Mark H. Anbinder
Ithaca, New York

Letters should be mailed to Letters, Macworld, *501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702) or MCI Mail (addressed to* Macworld*). Include a return address. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.*

At only $995* it's the most affordable tape system you can own. And we can *back it up*.

Sooner or later your Macintosh will need the security of data back-up. So the question is, which method? Removable disk media is too expensive. Floppies are too slow. And some systems/media are too volatile.

That's why the Braemar SX40 Data Cartridge Sub-system makes sense. There's no faster, safer method of back-up than cartridge tape. And now, the Braemar SX40 makes it affordable.

Braemar is a leading manufacturer of tape-based systems for the OEM marketplace. In fact, we make many of the drives sold by our competition.

So obviously we can back our claim. And build it for less.

TO ORDER THE SYSTEM THAT BACKS YOU UP, CALL.

1-800-328-2719

*60Mb per Cartridge Capacity. The SX40 uses the DEI or 3M Series 2000 Data Cartridge.

"A WORLD LEADER IN DATA STORAGE TECHNOLOGY" Braemar

Dealers Circle 41 on Reader Service Card

End Users Circle 217 on Reader Service Card

The power to be your best.™

Macintosh® brought the power of a computer to everyone. Now the new Macintosh Portable lets you take it everywhere. Like all Macintosh computers, it runs thousands of powerful business programs that work in the same graphic, intuitive way. But because it's a portable, it'll run them on the run.

Portable doesn't mean light on power. In fact, the Macintosh Portable crunches spreadsheets and draws complex graphics twice as fast as the Macintosh SE, our most popular computer.

An optional adaptor lets you show your Macintosh Portable screen on a TV screen. So you can use your hotel room for a Desktop Media presentation. And with an optional internal modem, you can send or receive information anywhere in the world. As long as you're next to a phone.

With up to 2 megabytes of RAM, you'll have plenty of space to run the most sophisticated programs. And with up to 40 megabytes of internal hard disk storage, you'll be able to take a lot of them along. In very little space.

If the keyboard feels like a real Macintosh keyboard, there's a good reason. It is. Another reflection of our design philosophy: Portability, yes. Compromises, no.

© 1989 Apple Computer Inc

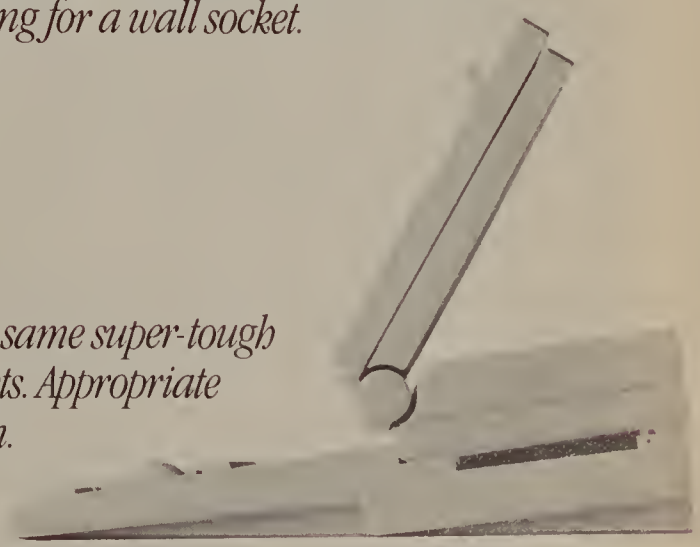
The Macintosh

Even when there's no power.

We don't want you knocking around without a carrying case, so one comes with every Macintosh Portable. There's room for paperwork, extra disks, the battery charger, even an extra battery. We thought of everything.

Another thing you won't find in other portables is our Active Matrix display technology. The Macintosh Portable screen is the only battery-powered screen fast enough and sharp enough to display spectacular Macintosh graphics — even animation.

You could change the world in 10 hours. That's how long a battery charge typically lasts in the Macintosh Portable. That's 2-3 times longer than most other portables. A special Power Management System conserves power by putting the computer into a "sleep" mode whenever you take a break. It even has a handy little "fuel gauge" that tells you when it's time to start looking for a wall socket.



This polycarbonate shell is the same super-tough stuff used in motorcycle helmets. Appropriate protection for a precious brain.

The trackball does everything a mouse does. In less space. It allows you to control the computer without complex keyboard commands. You can even switch it to the other side of the keyboard if you're left-handed. Or if you still prefer the mouse, just plug it into the back. No other portable can give you the thoughtful details you'll find in the Macintosh Portable. Simply because no other portable is a Macintosh.

Portable is here.

The power to be your best.™

Panorama Will Permanently Alter Your Viewpoint On Flat-File Databases

If you have the impression that all flat-file databases are pretty much alike, you're in for a big surprise. True, you can use any database to simply store and retrieve information, but that's where the similarities between Panorama and ordinary flat-file databases comes to an abrupt halt.

What makes Panorama so formidable is its spreadsheet-like analysis features that give you the power to unlock the secrets hidden in your data. In seconds a mass of sales figures becomes a valuable report ranking your top customers. Or, just as easily, Panorama tells you who your hottest salesmen are, what products are your biggest money-makers, or what regions have the fastest growth. **Instead of just storing data, Panorama uses it to reveal the kind of useful information you need to get an edge on the competition.**

Of course, data analysis isn't Panorama's only strength—it's got everything you'd expect in a full featured database and then some. Panorama's blazing speed, data entry shortcuts (including **Clairvoyance**®), full pallette of form design tools, mail-merge capabilities, macro recorder, Flash Art™ and semi-relational features have earned it accolades in review after review. In fact, MacUser editors were so impressed they selected Panorama as their **1988 "Eddy" Award Winner** in the flat-file category. So climb aboard—let Panorama start paving your road to success today!

Demo Video Only $9.95*

Now you can watch the same 30 minute Panorama demo that has captivated packed audiences at user groups and trade shows all over the country. **Call us today** to order your copy of this informative VHS tape, or send your name, address and payment to:

PROVUE DEVELOPMENT
15180 Transistor Lane
Huntington Beach, CA 92649
(714) 892-8199

*Price refundable with purchase of Panorama
CA residents add 6% sales tax.

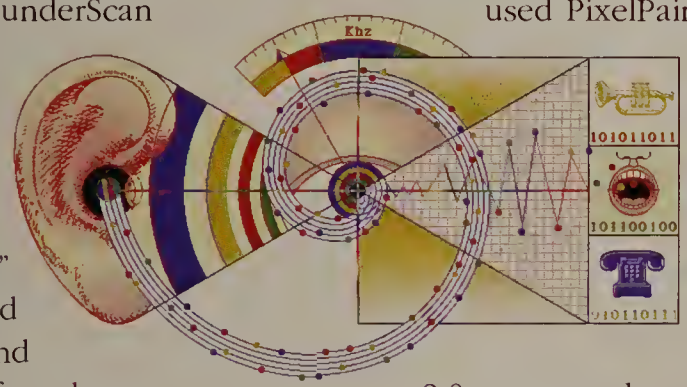
Circle 451 on reader service card

ART BEAT

by Deborah Branscum

This column examines the tools and the talent behind Macworld's graphics

Artist: John Craig lives and works in a bucolic Wisconsin setting that includes apple orchards and grazing sheep.
Tools: Mac II, ThunderScan scanner, and PixelPaint 2.0.
How It Was Done: For this month's "Getting Started with Sound," Craig researched sound waves and sound science for a better understanding of the topic.



"I wanted to do a spiral to represent how you might experience a sound wave if you were inside it," he says. The spiral also represents "a musical staff, with the notes broken into primary colors for different voices."

Because PixelPaint doesn't have a spiral-drawing tool, Craig went to a drafting book to find the traditional way to plot a spiral. When the spiral was done, it suggested the eye idea.

"The way sound works with the Mac is visual, so I wanted the eye and ear connection." Then to balance the image, Craig added the screen of sound information. The right part of the image represents capturing sound. Craig wanted the jagged lines over the grid to be reminiscent of a sound wave but more structured, to represent the binary aspects of sound.

The ear, trumpet, and telephone were part of a catalog of existing images Craig has, which he scanned in with his ThunderScan. He used PixelPaint 2.0 to create the rest of the image, lassoing the end of the spiral and aligning it with the ear after the ear was brought in as a Clipboard MacPaint image.

As a veteran PixelPaint user, Craig is happy with 2.0, except for a misnumbering problem with the metric ruler. "This version has the Pantone colors that I'm familiar with, so that, along with the new color palettes, is an advantage."

His biggest gripe at the moment is a badly fragmented 80MB hard disk. Craig says it's absurd that he's already filled up the disk, but housekeeping is difficult. "It's hard to go back and throw out all my old files. I bought the drive a year ago and thought it would be a bottomless pit, but now it's bulging." ■

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MacUser, October 1988

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More Rave Reviews for the #1 SQL Database.

PC WEEK

Oracle for Mac Solves DBMS Puzzle

SQL/HyperCard Combo Produces Sophisticated Applications

By Susan Janus

Database giant Oracle Corp., of Belmont, Calif., recently rounded out the list of platforms supported by the company's relational database-management system (DBMS) with the release of Oracle for Macintosh.

The new Mac DBMS teams the power of Oracle's Structured Query Language (SQL) with HyperCard's customizable and easy-to-use interface.

This combination allows Mac developers to create sophisticated applications that appear simple to users—a unique software-development opportunity unavailable on any other platform, including the PC, according to early corporate users we contacted.

In addition, users said, the network version of Oracle for the Mac allows the advantages of the HyperCard interface to serve as a front end to existing corporate relational databases residing on other platforms, such as mainframes and minicomputers.

Consequently, the Mac software has great potenti[illegible] for s[illegible]

Oracle for Macintosh

DBMS Brings New Power and Face to Mac Application Development

WHAT CORPORATE BUYERS LIKE

- Offers SQL capabilities
- Uses HyperCard to mask complexity of database applications
- Serves as front end to relational databases on other platforms
- Can link different Oracle database platforms with network version
- Provides good documentation and support

oping database-managemen[illegible] systems to connect departmental Macs to larger systems. Jeff Menz, a systems analyst for a scientific R and D organization, is currently using Oracle for Macintosh to develop a system that will give the company's numerous Mac users access to an Oracle database running on a VAX. Using the networking version, Menz will link departmental AppleTalk networks to the VAX over a TCP/IP network.

Oracle Provides the Groundwork

The key benefit of Oracle's product is that "all the fundamental technical work—the protocols, the compatibility with the AppleTalk network—has been done by Oracle," Menz said. "I just have to build the HyperCard interface and do the database design work."

The result will be an Oracle relational-database application on the VAX with a HyperCard front end that Mac users feel comfortable with, he explained. Also, the company will have one logical relational database instead of numerous fragmented local databases. This allows tighter security, improved data integrity and better performance, he added.

"ORACLE for Macintosh is a well-designed product ... a programmer can, with just an hour's training, create a database on a host with a simple Macintosh interface in three minutes—honest." ⚡⚡⚡⚡

MacUser, June 1989

"ORACLE for Macintosh is exciting for companies that have Oracle (or DB2) databases on a mainframe and want a practical Mac data entry and development system."

Mac Week, March 14, 1989

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MacGuide Magazine, June 1989

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[1]Stand alone version licensed for developers only. Requires Macintosh SE or II with 2 Megabytes of RAM, 5 Megabytes hard disk space, floppy disk drive, and HyperCard 1.2. Includes 30-day installation support, ORACLE database, Hyper*SQL (HyperCard Interface), SQL*Plus, OCI and Pro*C (Macintosh Programmer's Workshop is required for programming usage), System Stacks and Example Stacks. Full networking version is $999 and includes SQL*Net (for database communications), Async, 3270, DECNet, TCP/IP support, Alisa System's TSSnet DECnet protocol and drivers and Kinetic's TCPort TCP/IP protocol and driver. Accessing database software on other machines requires a separate protocol handler and gateway software for the other machine. Call for additional information.

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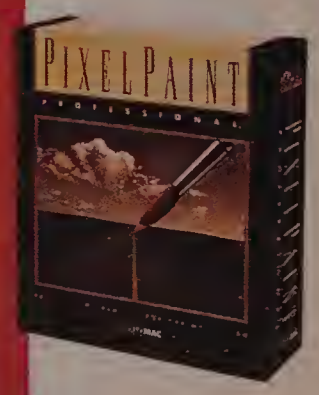
SEE PAGE 2



PIXEL PAINT PROFESSIONAL
32-bit color paint program
Page 33

MICROSOFT WORD
New page design [illegible]

SIMMS CHIPS
Brainpower for your Mac
Page 33

SUPERCARD
Create

2

Kerry
Customer Service Director

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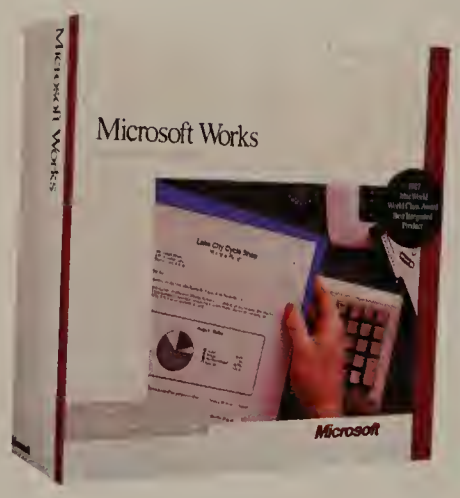


Puts it all together in one package

Works 2.0

Works 2.0 integrates the most-needed office applications: spreadsheet, database, word processor and terminal software. Works provides a significant degree of convenience for anyone who needs to share data among several applications, but hasn't the RAM necessary to run Multi-Finder.

The spreadsheet, with 230 columns and 9,999 rows, behaves like Multiplan or Excel. The word processor looks and acts like Word with Short Menus selected. The new version now includes the Spellswell spelling checker. The word processor has a MacPaint-like Draw command.

The database manager offers a solid selection of standard "flat file" manager functions. You can select and sort records in a variety of ways, and the module supports a useful set of mathematical functions for computed fields.

The simple, easy to use terminal module supports MacBinary transfers for error-free data transmission and reception. Winner of the 1988 *Macworld* World Class Award.

BUS 0014 NCP
Publisher: Microsoft
Suggested Retail: ~~$295~~

$185

Handy tool for technical writers

Formulator

Use Formulator to create mathematical equations and scientific formulas — then paste them into a word processor or DTP document. Special symbols, from Greek characters to integrals and radicals are all built into Formulator. It makes the distinctions among super and subscripts, and normal characters at different levels, and selects the appropriate point size.

WRD0027 NCP
Publisher: ICOM Simulation
Suggested Retail: $149.95

$89

Bigger, better, and more powerful than ever

Excel 2.2

Excel 2.2 delivers a host of improvements and new features. Excel can now use the full memory of your Mac — up to 8 Megabytes. It recalculates up to 40% faster and empty cells consume no memory at all. Cell annotation lets you add notes to any cell and auditing functions help you trace cell references.

The new Search and Replace function makes global changes. Charting is improved — just double-click anywhere on a chart to see the dialog box for all the chart formatting commands. Charts are now dynamically linked to the original worksheet, so the chart automatically reflects any changes in the spreadsheet. Excel 2.2 also supports "warm links" to Word 4.0, so changes to your spreadsheet data automatically appear in your Word documents.

BUS 0003 NCP
Publisher: Microsoft
Suggested Retail: ~~$395~~

$249

Brimming over with new capabilities

MacWrite II

MacWrite II now offers multiple columns, mail merge, foot notes and end notes, multiple documents, font sizes from two to 500 points, direct import/export of files (for MS Word, MS Write, MS Works, and WriteNow), plus the ability to search and replace by font, size and style.

WRD 0026 NCP
Publisher: Claris
Suggested Retail: ~~$249~~

$185

Microsoft's basic, "no-frills" word processor

Write 1.0

Microsoft Write is great for people who like Word but don't need all its fancy functions. Microsoft calls it "a streamlined subset of Word." Write is fast, and full of useful functions, such as a spelling checker with an expandable 80,000 word dictionary, footnoting, the ability to embed graphics in text, multiple columns, page preview mode, and suppression of headers and footers on title pages. If you don't need mail merge, outlining, glossaries, or style sheets Microsoft Write is right for you.

WRD 0014 NCP
Publisher: Microsoft
Suggested Retail: ~~$175~~

$79

An old favorite gets better

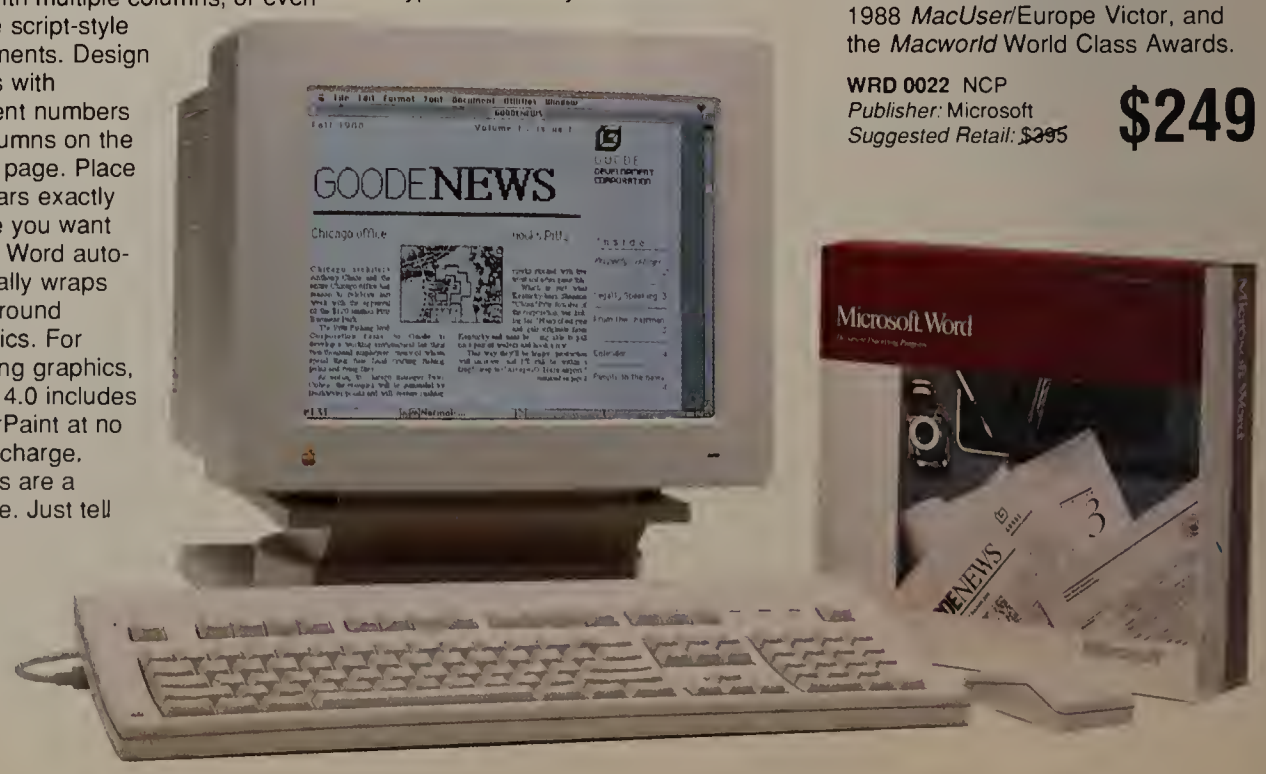
Word 4.0

Word 4.0 adds new page design capabilities to the feature-laden previous versions. Create newsletters with multiple columns, or even movie script-style documents. Design pages with different numbers of columns on the same page. Place sidebars exactly where you want them. Word automatically wraps text around graphics. For creating graphics, Word 4.0 includes SuperPaint at no extra charge. Tables are a breeze. Just tell Word how many rows and columns you need, and it generates your table, with automatic text wraps within cells. Word even has facilities for creating mathematical formulas.

Word 4.0 has a spelling checker, hyphenation, Style Sheets, a glossary, automatic indexing, mail merge, and an integrated outliner. It is compatible with the MS-DOS version of Word, and with PageMaker (both Mac and PC versions), so you can exchange files among all four formats. Version 3.0 won the 1988 *MacUser*/Europe Victor, and the *Macworld* World Class Awards.

WRD 0022 NCP
Publisher: Microsoft
Suggested Retail: ~~$395~~

$249



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HARDWARE
HARD DISK DRIVES

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Cutting Edge Hard Disk Drives

The Cutting Edge series of hard disk drives (both internal and external versions) plug directly into your Mac's SCSI port and are pre-formatted, so they're ready to use, right out of the box. They're fast, compact, virtually noiseless, and use components from Seagate Technology (the world's leading manufacturer of hard disk drive mechanisms).

The design is not only attractive, but also functional, because it creates a convection cooling current, just as the Mac does. The steel alloy case also helps to radiate heat. All of that means Cutting Edge drives can use a smaller, quieter fan to assist the natural cooling process. A back panel SCSI address switch, plus a second SCSI plug, make daisy-chaining simple and convenient. You can connect up to seven SCSI devices (including scanners and printers) to the Mac, and the address switch tells the Mac where to look for your hard disk on the loop. For greater convenience, the back panel has an extra AC plug.

The internal drives work on the Mac SE, II, IIx, and IIcx. An LED for the front panel indicates disk access. The drives connect directly to the internal SCSI port, so they do not need an address switch. They do not have fans, because the Mac SE and II already have fans. Their rear mount bracket means that you can keep your double internal floppy disk drives.

All Cutting Edge drives carry the manufacturer's one-year warranty, plus a lifetime warranty on the cables and switches. Also, they come with a generous amount of public domain software, the current Apple System and freeware hard disk drive utilities, HD Backup, and a personalized copy of the TCE Manager (formatting and diagnostic software), and an anti-viral package.

20 Meg Under the Mac Drive

DRI 0157
Manufacturer: Cutting Edge
Suggested Retail: ~~$649~~
$439

30+ Meg Under the Mac Drive

DRI 0158
Manufacturer: Cutting Edge
Suggested Retail: ~~$749~~
$499

45+ Meg Under the Mac Drive

DRI 0159
Manufacturer: Cutting Edge
Suggested Retail: ~~$829~~
$549

65+ Meg Under the Mac Drive

DRI 0160
Manufacturer: Cutting Edge
Suggested Retail: ~~$899~~
$629

80+ Meg Under the Mac Drive

DRI 0161
Manufacturer: Cutting Edge
Suggested Retail: ~~$1099~~
$739

XL 30 Internal

DRI 0110
Manufacturer: Cutting Edge
Suggested Retail: ~~$599~~
$469

XL 45 Internal

DRI 0111
Manufacturer: Cutting Edge
Suggested Retail: ~~$799~~
$645

Removable cartridges for extra security and protection

Cutting Edge 45MB Removable Hard Drive

The Cutting Edge 45 megabyte removable hard drive provides incredible flexibility. It features a SyQuest™ mechanism, excellent driver software and an average access speed of 25 milliseconds. This high performance drive is actually faster then many fixed drives and provides low cost expandability. Just replace the 45 megabyte cartridge with a new one whenever you need more storage. Since the cartridges are removable you can take them with you or lock them up for security. The Cutting Edge removable hard drive is easy to use, the cartridge just inserts into the receptacle like a tape player cartridge. Ejection is automatic, just use the eject command or drag the icon into the trash can. Cutting Edge removable cartridge drives make backing up and archiving files simple and easy to retrieve. You can share data with any Macintosh computer that is equipped with a Cutting Edge 45 Megabyte Removable Hard Drive. Now transferring large volumes of data between systems is as easy as passing a cartridge around.

DRI 0162
Manufacturer: Cutting Edge
Suggested Retail: ~~$1599~~
$995

Inexpensive, dependable external disk drive

800K Disk Drive

The Cutting Edge 800K External Disk Drive makes any Mac easier to use, even if you have a hard disk. It reads and writes both single and double sided floppy disks with equal ease. If you find yourself jumping through hoops every time you need to copy a floppy, you'll appreciate the convenience of having a second floppy disk drive. Just drag the first disk's icon over to the second disk, and let the Mac copy the contents. If you've suffered through the nuisance of trying to boot up a crashed system with a dysfunctional hard disk when you have only a single floppy disk drive, you'll appreciate the extra disk drive. At this price, why put it off?

The Cutting Edge disk drive is quiet, sturdy and reliable, and carries a full one year warranty from the manufacturer. An LED indicates disk access, just like a hard disk drive. For extra convenience, it even has a front panel disk eject button, so you don't have to fool around sticking paper clips through that little hole to retrieve a stuck floppy disk. It's compatible with the Mac Plus, SE, and Mac II, (but won't work with the old 128K or 512K Mac unless you've upgraded it with the new ROMs to a 512KE).

DRI 0042
Manufacturer: Cutting Edge
Suggested Retail: $185
$149

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HARDWARE PRINTER INTERFACES

Need to hook up a parallel printer to your Mac?

Grappler Interface

The Orange Micro Grappler interface card connects your Mac to most parallel printers. Just plug the Grappler into the serial port, and it converts the output to the Centronics parallel format. If you have an old daisy wheel or dot matrix printer sitting around the office unused, put it to work and alleviate the traffic jam on your LaserWriter.

ACC 0227
Manufacturer: Orange Micro
Suggested Retail: ~~$119~~
$79

Highly intelligent printer interface

Grappler Interface L/Q

The Grappler LQ connects your Mac to any 24-pin dot matrix printer, or HP-compatible laser or ink jet printer — as if they were ImageWriter LQs. Just set the switch for the printer you want to use. For dot matrix printers, you can use any Mac, but for laser and ink jet printers, you'll need a Mac Plus, SE, or II, and a hard disk. Grappler does not recognize PostScript commands

ACC 0237
Manufacturer: Orange Micro
Suggested Retail: ~~$149~~
$103

Connects your Mac to most serial printers

Grappler LS

The Grappler LS works with serial Hewlett-Packard (and compatible) printers. Now you can print Mac documents on the HP ink jet printer, plus laser printers such as the LaserJet, Okidata, Kyocera, and Blaser. Grappler cannot print PostScript files.

ACC 0284
Manufacturer: Orange Micro
Suggested Retail: ~~$129~~
$103

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HARDWARE INPUT DEVICES

The more keys the better

Mac-101 Keyboard

The only extended keyboard available for the Mac 512, 512KE, and Plus. Includes macro software.

INP 0043
Manufacturer: DataDesk
Suggested Retail: ~~$194.95~~
$139

Mac-101 Keyboard ADB

For the Mac SE.
INP 0047
Manufacturer: DataDesk
Suggested Retail: ~~$194.95~~
$139

Mac-101 Keyboard MacII

For the Mac II.
INP 0048
Manufacturer: DataDesk
Suggested Retail: ~~$194.95~~
$139

Retire your mouse

New Turbo Mouse

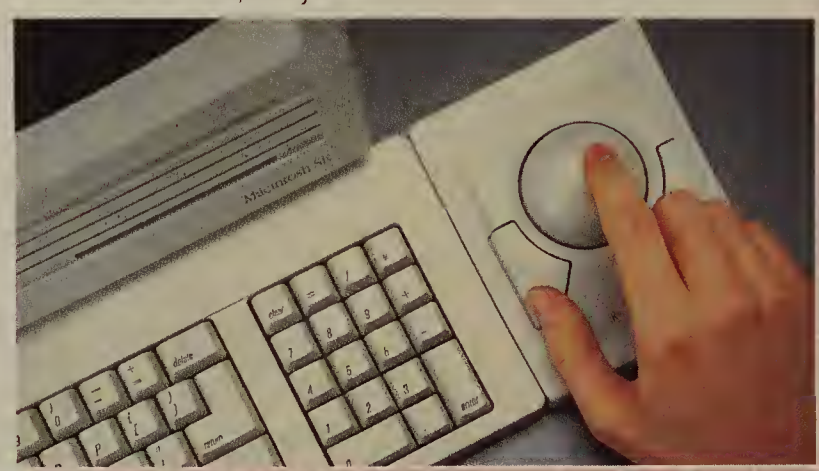
Kensington's New Turbo Mouse speeds up Mac use, and saves desk space. The Turbo Mouse is like an upside-down mouse, or a track ball, so you only need to move the ball in its socket, not the whole assembly. Nudge it for tiny adjustments, or give it a good spin to dash across the screen. The automatic acceleration sensor is like a two-speed automatic transmission. It speeds up cursor movement when you move faster, and slows it down for precise positioning. A second button is a click lock, and you can assign one of seven common functions (Close, Save, Print, etc.) for both buttons at once. This well-designed mouse alternative won the 1988 *Macworld* World Class Award.

New Turbo Mouse 512, Plus

For the Mac 512, 512KE, and Plus.
INP 0059
Manufacturer: Kensington
Suggested Retail: ~~$169.95~~
$109

New Turbo Mouse ADB

For the Mac SE or II.
INP 0060
Manufacturer: Kensington
Suggested Retail: ~~$169.95~~
$109



High-tech alternative pointing device

QuadLYNX Trackball

The QuadLYNX Trackball uses Honeywell aerospace technology to give you precise fingertip control over cursor movement. This device offers much greater precision in cursor placement than the standard-issue Apple mouse. Just spin the trackball and the cursor flies across the screen, quickly and accurately landing where you want it.

If you're using a large screen monitor, you need a trackball. It's also great for desktop publishing, CAD/CAM, graphics, and arcade games.

QuadLYNX Trackball

For the Mac 512, 512KE, and Plus.
INP 0050
Manufacturer: Lynx Computer
Suggested Retail: ~~$99.95~~
$69

QuadLYNX Trackball ADB

For the Mac SE or II.
INP 0051
Manufacturer: Lynx Computer
Suggested Retail: ~~$99.95~~
$69

Enter the world of optical mousing

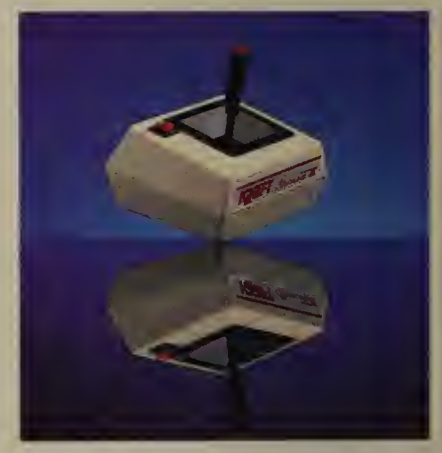
A+ Mouse

The A+ Mouse has no moving parts, except for the mouse itself. It uses an infrared LED and a reflective plastic mouse pad to determine its position. The mouse glides over the glassy smooth surface of the pad. Anyone who works with graphics or CAE/CAD applications will appreciate the convenience and precision of an optical mouse. Comes with manufacturer's lifetime warranty.

INP 0044
Manufacturer: Mouse Systems
Suggested Retail: ~~$99~~
$63

A+ Mouse ADB

For the Mac SE and II, connects to the Apple Desktop Bus.
INP 0045
Manufacturer: Mouse Systems
Suggested Retail: ~~$129~~
$83



Combo joystick and mouse for precise cursor ontrol

Kraft QuickStick

The button placement ensures fast action and comfortable use, whether you're playing an arcade game or working on a complex page layout. Precision gimbals and dual-axis fine-tuners give you complete control over its operation. Comes with manufacturer's five-year warranty.

ACC 0015
Manufacturer: Kraft
Suggested Retail: ~~$59.95~~
$39

Kraft Premium III Joystick

The Kraft Premium III Joystick is the same as the QuickStick, but it connects to the ADB port of the Mac SE or Mac II. It also works with the Apple IIgs.
INP 0064
Manufacturer: Kraft
Suggested Retail: ~~$79.95~~
$51

HARDWARE MEMORY UPGRADES

Run your SE up to four times faster with an accelerator

MaraThon 020 Accelerator Boards

MaraThon 020 Accelerators are equipped with a 68020 chip running at 16 MHz. They rival the Mac II's performance, for a fraction of the cost. Because MaraThon 020 Accelerators use a programmable Logic Cell Array controller, you can re-configure them to accommodate future hardware upgrades or to optimize them for specific tasks. The on-board expansion slot gives you back the expansion slot you gave up to install the accelerator.

MaraThon 020 Accelerator MSE1

DRI 0098
Manufacturer: Dove
Suggested Retail: ~~$699~~
$429

MaraThon 020 Accelerator MSE2

Includes one megabyte on-board memory.

DRI 0125
Manufacturer: Dove
Suggested Retail: ~~$1199~~
$719

MaraThon 020 Accelerator MSE3

Includes 68881 Math Co-processor, no memory.

DRI 0126
Manufacturer: Dove
Suggested Retail: ~~$999~~
$599

MaraThon 020 Accelerator MSE4

Includes one megabyte on-board memory and 68881 Math Co-processor.

DRI 0127
Manufacturer: Dove
Suggested Retail: ~~$1499~~
$899

Enjoy maximum speed with an accelerated 68030 chip

MaraThon 030 Accelerator Boards

The MaraThon 030 Accelerator Boards make your Mac II, IIx, or SE/30 sing. They employ a 68030 chip running at 32 MHz, which has its own 256K data and instruction caches on the chip itself (selectable through the Control Panel). Just remove your old 68020 and plug the compact 030 Accelerator card into its socket. The Logic Cell Array controller is programmable for future upgrades or to optimize operations for a specific task.

MaraThon 030 Accelerator Board

For the Mac II. Plugs directly into the 68020 chip socket to provide you with a 69030 chip running at 32 MHz. A 68882 math co-processor is available as an option.

DRI 0130
Manufacturer: Dove
Suggested Retail: ~~$1599~~
$969

MaraThon 030/SE Accelerator Board

For the SE/30. Available options include up to four Megabytes of on-board memory, and the 68881 Math Co-processor or the 68882 Floating Point Unit.

DRI 0151
Manufacturer: Dove
Suggested Retail: ~~$1599~~
$1250

MaraThon 030/X Accelerator Board

For the Mac IIx.

DRI 0152
Manufacturer: Dove
Suggested Retail: ~~$1599~~
$999

MaraThon Racer

A high-speed cache card with accelerator-like performance designed for the Mac II, plugs into the existing 68020 socket on the Motherboard.

DRI 0181
Manufacturer: Dove
Suggested Retail: ~~$259~~
$162

Open your Mac in a snap

MacSnap Tool Kit

The essential tools for opening up your Mac 512, Plus, or SE to install memory upgrades, adaptor cards and fans. Includes the required hex screw driver, case spreader, and a static strap.

DRI 0040
Manufacturer: Dove
Suggested Retail: ~~$21~~
$15

Bring your Mac up to date - inexpensively

MacSnap Memory for Older Macs

MacSnap memory expansion kits give your old Mac (512, Plus, or SE) the power to run the new generation of software. Using MultiFinder, keep several applications open, and switch from one to another without quittting and launching. Or, explore the exciting world of HyperCard. You'll need at least two Megabytes to run System 7.0 when it arrives. So modernize your old Mac with more memory. It's cheaper than buying a new computer.

MacSnap 524E

Expands enhanced Mac 512KE to one Mb.

DRI 0120
Manufacturer: Dove
Suggested Retail: ~~$299~~
$187

MacSnap 524S

Expands enhanced Mac 512KE to one Mb. Includes SCSI Interface and external SCSI connector.

DRI 0065
Manufacturer: Dove
Suggested Retail: ~~$399~~
$249

MacSnap 548E

Expands enhanced 512KE Mac to two Mb.

DRI 0121
Manufacturer: Dove
Suggested Retail: ~~$699~~
$439

MacSnap 548S

Expands enhanced 512KE Mac to two Mb. Includes SCSI interface and external SCSI connector.

DRI 0068
Manufacturer: Dove
Suggested Retail: ~~$799~~
$499

Unleash your Mac - and save money

MacSnap CMOS Memory

MacSnap CMOS memory expansion kits require less power, so they run cooler than standard RAM chips. Don't settle for that one Megabyte Mac you bought because you couldn't afford the deluxe model. Upgrade it to full power with inexpensive, high-performance MacSnap memory.

MacSnap 2S CMOS

Expands Mac Plus or SE to two Mb. using one Mb. surface mount CMOS chips: expandable to four Mb.

DRI 0122
Manufacturer: Dove
Suggested Retail: ~~$476~~
$319

MacSnap 4S CMOS

Expands Mac Plus, SE or II from one Mb. to four Mb., with one Mb. surface mount CMSO chips.

DRI 0123
Manufacturer: Dove
Suggested Retail: ~~$952~~
$638

MacSnap 8S CMOS

Expands Mac II from one Mb. to eight Mb. using one Mb. surface mount CMOS chips.

DRI 0124
Manufacturer: Dove
Suggested Retail: ~~$1904~~
$1276

MacSnap Plus 2

Expands Macintosh Plus from 1024K to 2048K using 256K DRAM. Not expandable.

DRI 0036
Manufacturer: Dove
Suggested Retail: ~~$499~~
$312

MacSnap 2 SE

Expands Macintosh SE from 1024K to 2048K using 256K DRAM. Not expandable but fully compatible with internal expansion cards.

DRI 0099
Manufacturer: Dove
Suggested Retail: ~~$499~~
$312

Affordable Ethernet connections for the Mac

FastNet Ethernet Adaptors

FastNet connects your Macs to Ethernet LANs. It supports TCP/IP, EtherTalk, DECnet, and other protocols, so you can talk to mainframes and minis at Ethernet speeds. The FastNet SCSI and FastNet II are intelligent controllers, with their own 68000 chips and RAM buffers to take the processing load off your Mac.

FastNet SCSI

FastNet SCSI is an external Ethernet adaptor that works with any Mac with a SCSI port. It is an intelligent controller with its own 68000 chip and 512K buffer RAM, but is not as fast as the FastNet NuBus cards.

DRI 0142
Manufacturer: Dove
Suggested Retail: ~~$1249~~
$785

FastNet II

FastNet is an intelligent NuBus card for the Mac II, with 512K RAM, 64K ROM, and a 68000 chip.

DRI 0143
Manufacturer: Dove
Suggested Retail: ~~$899~~
$565

FastNet III

FastNet is a NuBus card for Mac II, but without on-board intelligence and buffering.

DRI 0144
Manufacturer: Dove
Suggested Retail: ~~$599~~
$375

FastNet SE

Plugs directly into the SE's slot, and has 64K RAM and 64K PROM.

DRI 0145
Manufacturer: Dove
Suggested Retail: ~~$599~~
$375

FastNet SE/30

Plugs directly into the SE/30's slot, and has 64K RAM and 64K PROM.

DRI 0146
Manufacturer: Dove
Suggested Retail: ~~$599~~
$375

GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

MacSnap 4S (Dove)
The 4S is a 4 Meg memory expansion kit that allows you to get the maximum amount of memory in the Plus and SE or a 4 meg upgrade for the Mac SE/30, II, IIx or IIcx. The 4S uses state-of-the-art 1 mb, surface mount CMOS SIMMs and guarantees that today's memory investment will continue to work and grow with you. Step by step manual for easy installation, Dove offers a toll-free number for service and support. (memory) **$638.**

ACCESSORIES

Apple
Toner Cartridges LaserWriter ..... 109.
Avery Labels (full line available)
Color Coded 3.5 Diskette ..... 4.
Laser 3.5 Diskettes ..... 29.
Laser File Folders ..... 6.
Laser Transparencies ..... 22.
Basic Needs, Inc.
HardTop Keyboard Covers ..... 15.
HardTop ImageWriter Covers ..... 17.
Keyboard Flip ..... 6.
Dust Covers - grey Nylon Ripstop
ImageWriter or LaserWriter ..... 12.
Mac Plus and keyboard ..... 11.
Mac SE and extd. or reg. keyboard 11.
Mac II and extd. keyboard ..... 12.
Universal Laser Printer Stand ..... 26.
Computer Friends, Inc.
MacInker *(IW & IW II)* ..... 41.
MacInker Black Ink ..... 3.
Curtis
Computer Tool Kit (52 pc.) ..... 49.
Curtis Clip ..... 6.
Disk Holder (holds 40) ..... 9.
Jewel Surge Suppressors ..... Call.
Ergotron
MacTilt-SE ..... 68.
MacTilt II-RGB ..... 75.
Goldstein & Blair
The Macintosh Bible ..... 20.

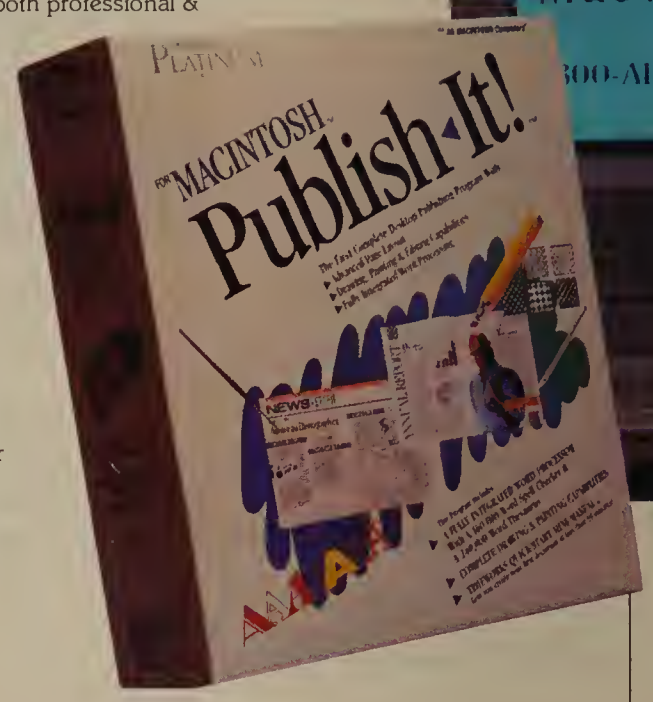
I/O Designs
Imageware II Carrying Case ..... 49.
Macinware IIcx Carrying Case ..... 89.
Macinware Mac II Carrying Case ..... 99.
Macinware Plus Carrying Case ..... 64.
Macinware SE Carrying Case ..... 75.
Monitorware Apple RGB Case ..... 79.
Ribbons black ..... 4.
Ribbons color ..... 5.
Kalmar
Rolltop Teak disk holder 45 ..... 14.
Rolltop Teak disk holder 90 ..... 21.
Rolltop Teak disk holder 135 ..... 31.
Kensington
Anti-Glare Filter ..... 33.
Apple Security Kit ..... 34.
Mac II Stand w/Cable Kit ..... 65.
MasterPiece Mac II ..... 105.
PowerBacker 330 UPS Line ..... 269.
System Saver ..... 64.
MacWarehouse
Mouse pad ..... 7.
Mobius Products
Fanny Mac QT ..... 60.
SE Silencer ..... 39.

MacPrint (Insight Development)
Introducing MacPrint - the easy-to-use software utility that lets you use almost any Mac application on virtually any printer including HP LaserJet II and IID. MacPrint displays all your printer's fonts for true WYSIWYG performance. Prints text and graphics at your printer's maximum resolution. After the simple installation, it's completely transparent in operation. It's the cost effective print option for your Mac. (utilities) **$79.**

Orange Micro
Grappler L/Q or LS ..... 103.
Polaroid
Circular Polarizing Filter ..... 35.
Read-Write
CompuDuster ..... 29.
Kleen & Dry CRT Pads ..... 5.
Computer Care Kit ..... 45.

MacLuggage is designed with you in mind. You need a case that is easy to carry, holds up under tough conditions, and gives your valuable equipment maximum protection. DuPont Cordura™ nylon and High Density foam combined with 2" nylon webbing and cross and box stitched stress points makes this the most protective and durable case available. We are so confident that our products will last forever that we back them with a **LIFETIME GUARANTEE.** MacLuggage is available for ALL Macs and Imagewriters. (accessories) SE with Ext'd Keyboard Case **$75.**

Publish It! (Timeworks)
Complete self-contained Desktop Publishing program. Allows both professional & non-professional business communicators to write, design, and produce dynamic, sophisticated documents. From simple in-house newsletters & business forms to full-length magazines and distinctive annual reports; do it faster and easier than before! (desktop publishing) **$245.**



Smack-a-Mac
Smack-a-mac ..... 9.
SoundSight
FastKeys ..... 35.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) ... 75.
ImageWriter II Case (black) ..... 49.
Mac Plus/SE Case (black) ..... 59.

ACCOUNTING AND PERSONAL FINANCES

Aatrix
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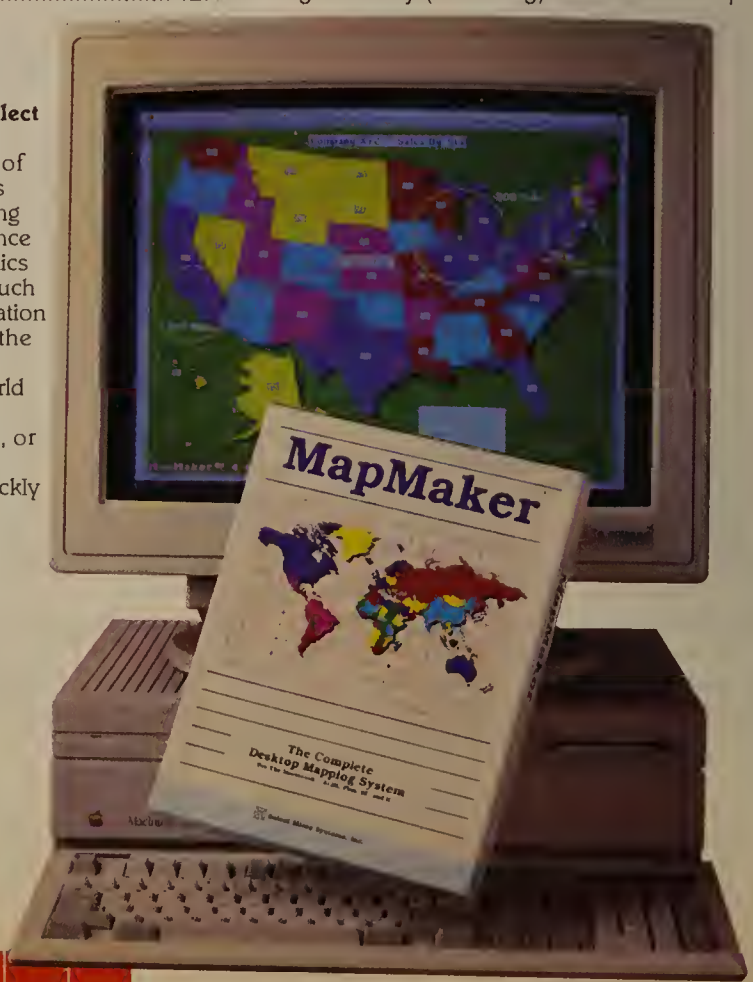
Payroll 3.5 ..... 109.
Payroll PLUS ..... 175.
TimeMinder ..... 175.
Bedford (Computer Associates)
Simply Accounting ..... 209.
Brown-Wagh Publishing
MacLedgers ..... 159.
Service Industry Accounting ..... 209.
DAC
Dac-Easy Light ..... 42.
Intuit
Quicken 1.5 ..... 36.
Layered, Inc.
at Once! ..... 295.
MECA
Managing Your Money ..... 125.
Monogram
Business Sense ..... 269.
Dollars and Sense ..... 81.
Nolo Press
For The Record ..... 29.
WillMaker ..... 32.
Peachtree
Back to Basic Professional ..... 159.
Reality Technologies
WealthBuilder ..... Call.
ShopKeeper Software
Bill-It 2.0 ..... 99.
Survivor
MacMoney 3.5 ..... 60.

BLANK MEDIA

B.A.S.F. made in U.S.A
DS/DD (box of 10) ..... 15.
DS/High Density (1.44 Meg) ..... 29.

MapMaker™ 4.0 (Select Micro Systems, Inc.)
Now includes dozens of powerful new features such as built-in drawing tools, on-screen distance measurements, graphics tablet support, and much more. Creates publication quality color maps of the U.S. by states and counties , and the world by country. Enter or import your own data, or use the included U.S. Census statistics. Quickly displays hidden relationships in geographic data with striking presentation graphics. Mac 512K, Plus, SE and II. (graphics) **$245.**



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FREE CATALOG
We carry more than 1200 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. If you can't find what you need call us for a free copy of our latest catalog.

Dreams (Innovative Data Design)
IDD, creators of MacDraft, offers a powerful precision drawing tool for professional scaled drawings, illustrations, presentations and general purpose graphics. Dreams offers zoom, rotation, layers, dimensioning, symbol libraries and a vast array of drawing tools, as well as many advanced illustration features. You can merge shapes together, cut edges of objects using other objects as templates, even glue lines and curves together to form unique shapes to be filled with colors or patterns. (graphics) **$269.**

WillMaker 3.0 (Nolo Press)
Make your own will! WillMaker's documents are valid in every state (except Louisiana), including the District of Columbia. Just answer the questions it asks, and WillMaker constructs a personalized will with full legal standing. No one likes to think about a will but WillMaker makes it easy. **$32.**

For the Record 1.02
Keep tabs on essential items like household inventory, locations of safety deposit boxes, insurance policies, names of guardians and trustees. It compiles every critical tidbit into a neatly organized database (personal finances) **$29.**

SuperPaint 2.0 (Silicon Beach)
Award winning SuperPaint combines the spontaneity of paint and the precision of Draw in one easy-to-use program. Powerful new features include AutoTrace™ automatically convert Paint graphics into Draw objects; a customizable airbrush; a freehand bezier tool to quickly sketch editable bezier curves; and Super Bits™ to edit bitmaps at any resolution. Mix fonts, styles and sizes in a single text block, freely rotate, scale, or slant text and graphics without sacrificing high-resolution output. (graphics) **$128.**

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DS/DD (box of 10) ..... 19.
Peripheral Land, Inc.
Turbo 40 Cartridge ..... 115.
Sony
DS/DD (box of 10) ..... 15.

BUSINESS AND PRESENTATION

A Lasting Impression
ResumExpert (word vers.) ..... 39.
Adobe Systems, Inc.
TrueForm SetUp ..... 229.
AEC Management Systems
FastTrack Schedule ..... 115.
Aldus
Persuasion 1.0 ..... 375.
Antic Software
FlexForm BusinessTemplates Vol 1 or Vol 2 ..... ea. 49.
Ashton-Tate
Full Impact ..... 249.
Avery
List & Mail ..... 79.
Claris
MacProject II ..... 379.
SmartForm Designer w/Assistant .. 299.
Cognition Technology
MacSMARTS PRO ..... 249.
Cricket (Computer Associates)
Cricket Graph 1.3 ..... 115.
Cricket Presents ..... 285.
DeltaPoint, Inc.
DeltaGraph ..... Call.

GOfer (Microlytics)
The ultimate text finder. A powerful software utility that searches, finds and retrieves text. Searches through countless files on your hard disk drive or floppy disks to find the text you need. A phrase, a fact, a note, a date. If you need it, GOfer finds it in seconds. You can automatically import the section of text into the document you're currently working in. You save hours searching through files. GOfer operates as a Macintosh desk accessory. (utilities) **$47.**

HyperPress Publishing
Intelligent Developer ..... 225.
Informix
WingZ ..... 259.
Microsoft
Excel 2.2 ..... 249.
The Microsoft Office ..... 499.
PowerPoint 2.1 ..... 249.
Works 2.0 ..... 185.
Power Up
Calendar Creator ..... 38.
FastForms! ..... 89.
Preferred Publishers
Direct Mail ..... 55.
ProPlus
Wall Street Investor ..... 469.
Satori
Bulk Mailer 3.2.3 ..... 78.
Softview
FormSet ..... 52.

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Bring custom text and graphic effects to your favorite word processor, page layout or presentation program. It uses PostScript language inside your laser printer to preview precisely how your effect will print. Rotate text, and modify effects instantly. SmartArt I or III, for text effects or SmartArt II for Graphic Effects. You don't have to be an artist to look like one! Requires Mac SE, Plus or II and a PostScript laser printer. (desktop publishing) **ea. $85**

Symantec
More II 2.01 ..... 249.
Symmetry
KeyPlan ..... 339.
Synex
MacEnvelope 4.1 ..... 55.
MacEnvelope Plus ..... 149.
Vertical Solutions
FastLabel ..... 49.

CAD/CAE

Claris
ClarisCAD ..... 599.
Generic Software
Generic CADD Level 1 ..... 85.
Symbols Libraries available ..... Call.
Graphsoft
Blueprint ..... 349.
MiniCad Plus ..... 519.
Innovative Data
MacDraft ..... 144.
Dreams ..... 269.
I.S.I.
Precision ..... 399.
Strata
StrataVision 3D ..... Call.

COMMUNICATIONS

CE Software
In/Out (1 to 5 Users) ..... 129.
QuickMail 2.0 (1-10 Users) ..... 259.
CompuServe
CompuServe Navigator 3.0 ..... 45.
CompuServe Subscription Kit 9.95
DataVIZ
MacLink Plus w/Cable 4.1 ..... 139.
MacLink Plus/Translators 4.1 ..... 115.
Dow Jones
News/Retrieval Membership ..... 24.
FreeSoft
Red Ryder 10.3 ..... 52.
Hayes
Smartcom II 3.1 ..... 88.
Infosphere
Liaison ..... 179.
InSignia Solutions
Soft PC (Mac II) ..... 249.
MetaComet
AccuWeather Forecaster ..... 58.
Prometheus
Acknowledge ..... 289.
Macknowledge ..... 149.
Software Ventures
Microphone II v.3.0 ..... 219.
Synergy
Versa Term Pro 3.0 ..... 175.
Traveling Software
Lap-Link ..... 83.

DATABASE SOFTWARE

Acius
4th Dimension 2.0 ..... 549.
AEC Management Systems
AEC Information Manager ..... 415.
Claris
FileMaker II ..... 229.
Fox Software
FoxBASE+/Mac ..... 255.
FoxBASE+/Mac MultiUser ..... 355.
FoxBASE+/Mac Runtime ..... 155.
Microsoft
File 2.0 ..... 125.
Odesta
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All of the features of envelope and label printing in one easy-to-use package. Import up to 1600 addresses. Unique Postal Bar Code printing speeds delivery. Create / save layouts, graphics, fonts, and colors. **$59.**
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Create reminders which interrupt you at an appointed time, beeps, & text editing reminders. **Appointment Diary** Features: Auto-layout, Day Layout, set reminders directly into Smart Alarms, Week or Month at a glance. Multi-User requires AppleShare or TOPS. (desk accessories) Single user **$49.**

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Instant, and reliable weather information direct from the nation's #1 weather service. Quickly download weather data by modem, then display it in easy to read maps, graphs, charts and forecasts. Hourly updates are available for every region of the country. Ideal for boating, construction and travel. Automated telecommunications makes it easy to use! (communications) **$58.**

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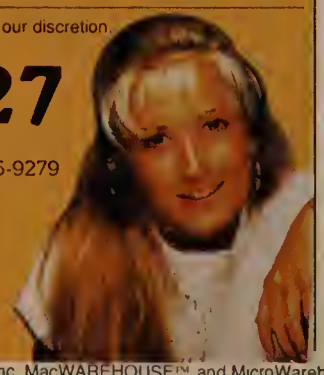

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FROM MacWAREHOUSE™

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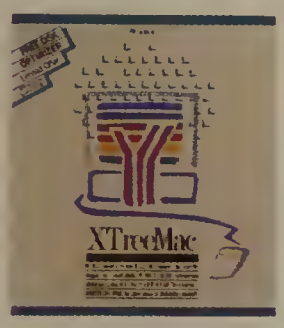
Just connect the Lap-Link Mac universal cable to the PC and the Mac and you're moving files in both directions. Comes with translators, cable, 3.5" and 5.25" diskettes. (communications) **$83.**



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XTreeMac simplifies disk management by displaying disk contents within it's unique Directory Tree. It finds, launches and retrieves deleted files, even after you've emptied the trash. Copies or moves files from multiple drives simultaneously. Everything that finder does and more. (utilities) **$58.**

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Casady & Greene
QuickDEX ..... 31.
JAM Software
Smart Alarms & Appointment Diary . 49.
Smart Alarms (1 - 4 users) ..... 99.
Smart Alarms (5 - 8 users) ..... 149.
Smart Alarms (9 - 16 users) ..... 199.
Preferred Publishers
DAtabase ..... 72.
Vantage ..... 55.
Solutions
SmartScrap & The Clipper 2.0 ..... 45.

DESKTOP PUBLISHING

Aapps
MicroTV ..... Call.
Aldus
PageMaker 3.02 ..... 389.
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Broderbund
DTP Advisor ..... 47.
Data Translation
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Icom Simulations
MacKern ..... 119.
Letraset
ColorStudio ..... Call.
ImageStudio ..... 275.
Ready,Set,Go! ..... 275.
Olduvai
Read-It! 2.1 (OCR) ..... 249.
Read-It! Personal ..... 99.
Read-It! TS (Thunderscan) ..... 79.
Quark
QuarkStyle ..... 175.
Xpress ..... 495.
Springboard
Springboard Publisher II ..... 109.
TimeWorks
Publish-It! ..... 245.

DISK DRIVES/BOARDS

Aristotle Industries, Inc.
HardPac Mac 20 Meg ..... 549.
HardPac Mac 40 Meg ..... 799.
HardPac Mac 80 Meg ..... 1195.
HardPac Mac 105 Meg ..... 1395.
CMS
MacStack 20 Meg ..... 529.
MacStack 30 Meg ..... 545.
MacStack 45 Meg ..... 625.
MacStack 60 Meg ..... 699.
MacStack 80 Meg ..... 799.
Cutting Edge
800K External Floppy Drive ..... 149.
SyQuest Removable 45Meg ..... 995.
Under the Mac 20 Meg ..... 439.
Under the Mac 30+ Meg ..... 499.
Under the Mac 45+ Meg ..... 549.
Under the Mac 65+ Meg ..... 629.
Under the Mac 80+ Meg ..... 739.
Dayna Communications
Dayna File Single 360K (5 1/4") .... 529.
Dayna File Dual 360K & 1.44M .... 669.
Dolphin Systems Tech
Integra 20 Meg ..... 545.
Integra 30 Meg ..... 595.
Integra 40 Meg ..... 765.
Integra 60 Meg ..... 815.
Integra 80 Meg ..... 1175.
Flipper 150 Meg Tape Backup .... 1439.
Flipper Removable 44 Meg ..... 1139.
Kennect Technology
Drive 2.4 ..... 359.
Rapport ..... 219.
Mobius
MultiScreen Video Card ..... 315.
PCPC
MacBottom Hard Drives ..... Call.
Peripheral Land, Inc.
Infinity Turbo 40 Meg ..... 1119.
Turbo Floppy 1.4 ..... 359.
Quantum
Quantum 40 MB Raw Drive ..... 545.
Quantum 80 MB Raw Drive ..... 869.

EDUCATIONAL PERSONAL

BrightStar
Alphabet Blocks 3.01 ..... 30.
Talking Tiles ..... 27.
Bootware Software
ResumeWriter Pro ..... 60.
Davidson
Math Blaster ..... 27.
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First Byte
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Fair Tide Technologies
Navigate! mono ..... 199.
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Elementary Signer ..... 49.
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The Software Toolworks
Mavis Beacon Teaches Typing ..... 35.
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HyperCard or Pagemaker 3.0 .... ea. 35.
Word 4.0 Video Tape ..... 35.

ENTERTAINMENT

Access Software, Inc.
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Artworx
Bridge 6.0 ..... 24.
Daily Double Horse Racing ..... 19.
GrailQuest ..... 19.

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Portable hard disk drive. Store your data and just unplug this compact, self-contained unit, tuck it into your briefcase, and take your data with you. The sturdy injection molded case, shock mounting, and automatic head parking protect the drive while it's in transit. HardPac Mac is a SCSI device with an input and output port for daisy-chaining. The SCSI address select switch allows you to plug it in without disrupting the host system.(drives)
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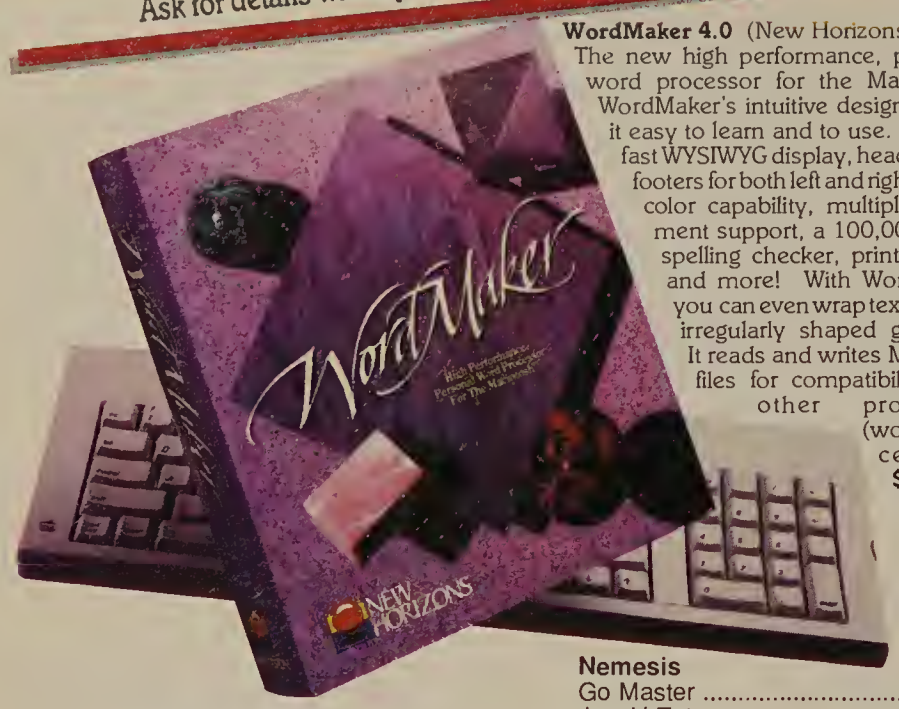
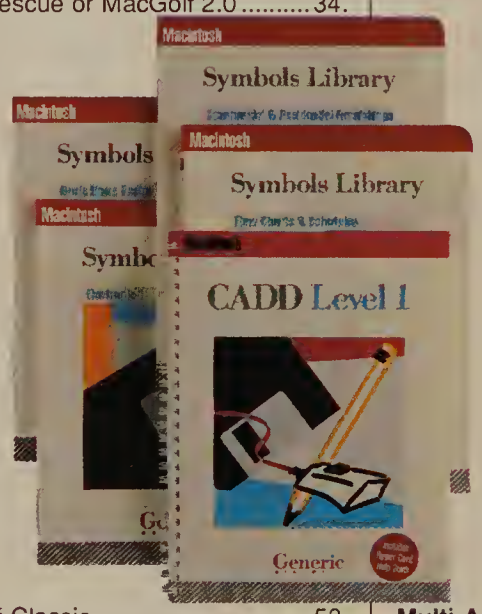


WordMaker 4.0 (New Horizons)
The new high performance, personal word processor for the Macintosh. WordMaker's intuitive design makes it easy to learn and to use. It has a fast WYSIWYG display, headers and footers for both left and right pages, color capability, multiple document support, a 100,000 word spelling checker, print merge, and more! With WordMaker you can even wrap text around irregularly shaped graphics. It reads and writes MacWrite files for compatibility with other programs. (word processing) **$69.**

Broderbund
Ancient Art of War At Sea ..... 27.
Shufflepuck Cafe ..... 24.
Where in the World is Carmen ..... 27.
Bullseye
Ferrari Grand Prix or P51 ..... ea 32.
Fokker Tri-plane ..... 29.
Centron Software, Inc.
BlackJack or CrapsMaster ..... ea 27.
CasinoMaster *(5 pack)* ..... 49.
Discovery Software
Arkanoid ..... 26.
Electronic Arts
Chuck Yeager Adv. Flight Trainer ... 32.
Miles Computing
Fool's Errand ..... 32.
Puzzle Gallery ..... 27.
Mindscape
Balance of Power, Deja Vu ..... ea. 30.
The Colony or Gauntlet ..... 30.

RoadRacer (XOR Corp.)
Drive a high-performance 1965 Corvette through 5 environments from super-high speed desert flats to twisting mountain roads. Uses digitized sounds, with spectacular scenery, obstacles, and wild crashes, fly over hills around curves at up to 200 mph. Score points for fast, skillful driving by steering and accelerating with your mouse and using your keyboard for brakes and shifting. Each level is tougher than the last. With the most sophisticated high-speed graphics ever achieved on a personal computer. For use on the Macintosh II, Mac Plus & SE (entertainment) **$39.**

Nemesis
Go Master ..... 49.
Joseki Tutor ..... 30.
PCAI/XOR
Lunar Rescue or MacGolf 2.0 ..... 34.



Generic CADD Level 1 (Generic Software)
Easy to learn and use. Drawing tools give you true CAD capabilities, including 256 layers, floating point precision and Bezier curves, NEW FEATURES include snap-to-grid, direct PICT file support. Symbol libraries also available. Now for a limited time, purchase a GENERIC CADD from MACWAREHOUSE and get a free symbols library, send a proof of purchase along with your choice of library to Generic Software.(please reference Nov. ad.) Offer expires 1/1/90 (cad/cae) **$85**

MacGolf Classic ..... 53.
Road Racer ..... 39.
NFL Challenge ..... 54.
Spectrum HoloByte
Falcon 2.0 ..... 31.
Tetris Color version ..... 24.
Springboard
Hidden Agenda ..... 36.
The Software Toolworks
Chessmaster 2100 ..... 32.
Life & Death ..... 32.
The Hunt for Red October ..... 32.

FONTS

Adobe
Adobe Type Manager ..... 59.
Fonts (full line avail.) ..... Call.
Forms and Schedules ..... 289.
Newsletters ..... 239.
Presentations ..... 289.
Textures, Fills, and Patterns ..... 139.
Altsys
Fontastic Plus 2.02 ..... 52.
The Art Importer 2.0 ..... 99.
Letraset
LetraStudio ..... 275.
LetraFonts *(various)* ..... ea. 69.
Tactic Software
ArtFonts Vol.I or 2 ..... 55.
Orange Micro
Alphabits ..... 69.

GRAPHICS AND DESIGN

3G Graphics
Images w/Impact
Graphics & Symbols 1 ..... 52.
Business 1 ..... 65.
Adobe
Illustrator 88 ..... 289.

Streamline ..... 229.
Aegis Development, Inc.
Showcase F/X ..... 199.
Aldus
Freehand 2.0 ..... 349.
Broderbund
Drawing Table ..... 75.
Casady & Greene
Vivid Impressions Vol. 1 ..... 67.
Claris
MacDraw II ..... 299.
MacPaint 2.0 ..... 99.
Cricket (Computer Associates)
Cricket Color Paint ..... 179.
Cricket Draw ..... 167.
Deneba
Canvas 2.0 ..... 169.
Dream Maker
Cliptures, Business Images ..... 85.
MacGallery ..... 27.
Electronic Arts
Studio/1 ..... 99.
Studio/8 ..... 299.
MacroMind
MacroMind Director ..... 449.
VideoWorks II ..... 175.
Miles
Mac The Knife (all volumes) ..... 39.
Mindscape
ZING ..... 125.

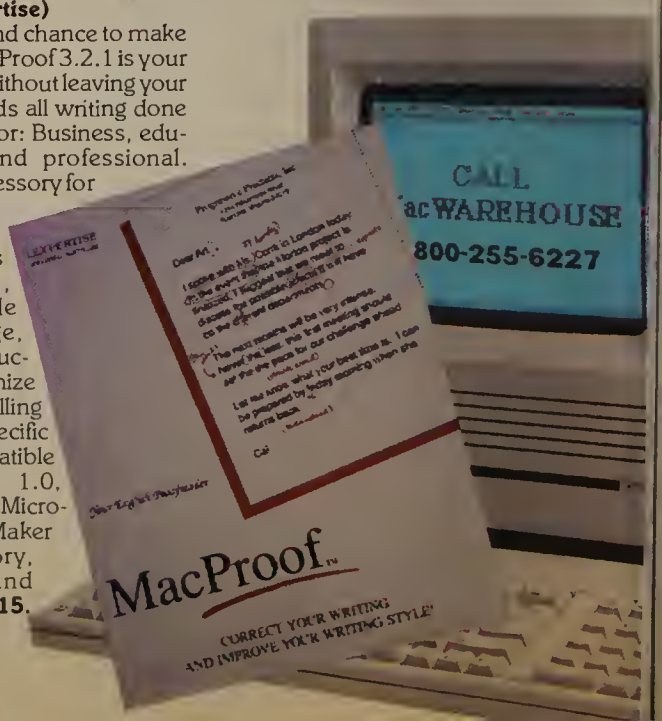
Multi Ad Services
ProArt: Bus., Sports or Holidays ea.95.
NuEquation
NuPaint ..... 89.
Paracomp
ModelShop ..... 399.
Swivel 3D ..... 289.
Select Micro Systems
MapMaker 4.0 ..... 245.
Silicon Beach
Digital Darkroom ..... 259.
Super 3D 2.0 ..... 325.
SuperPaint 2.0 ..... 128.
SuperMac
PixelPaint 2.0 ..... 229.

Bulk Mailer
The ideal mail list management system. Contains duplication elimination, various sorting capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements.(business) **$78.**

Bridge 6.0
Bridge 6.0 is a comprehensive contract or duplicate bridge - playing program which allows you and your computer partner to bid against two computer opponents and play out the hand. Ideal way for the novice to improve his or her game, and advanced player to get into a game without having to round up three additional players. (entertainment) **$24.**

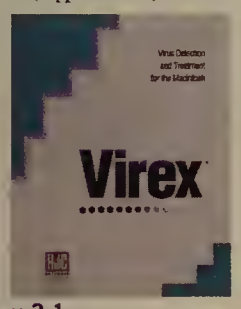
SmartOne Modem
Receive Electronic mail, check out stock portfolios or flight reservations. Features include Quicklink, MacNet, CompuServe, auto dial and a two year warranty. (modems) **$145.**

MacProof 3.2 (Lexpertise)
You'll never get a second chance to make a first impression! MacProof 3.2.1 is your English proofreader. Without leaving your document, it proofreads all writing done on your word processor: Business, educational, personal and professional. MacProof is a desk accessory for the Apple Macintosh Plus, SE, II, IIcx. Checks: mechanics (punctutation, spelling, capitalization, double words), Word usage, Writing style and Structure. You can customize the Usage and the Spelling dictionaries to your specific requirements. Compatible with MacWrite II V. 1.0, MacWrite V. 4.6 & 5.0, Microsoft Word 4.0, PageMaker 3.0, w/ 2mg memory, MindWrite V.1 and V.2.(spell checker) **$115.**

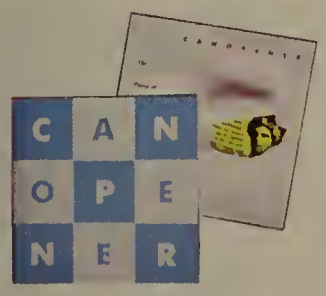


Mac-101 Keyboards (Data Desk International)
Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. International Versions also available. (input/output) **$139.**

Focal Point II
Personal information manager stores all those unrelated pieces of information that usually end up on loose scraps of paper. Time & Schedule Manager, Project & Task Manager, Clients & Vendors file, Expenses, and Phone Manager with an auto-dialer.(hyperware) **$117.**



Virex 2.1
Virus detection and treatment software. Intended for individuals that have unusually high risk of exposure to viral infections. Including Fortune 500 companies, and desktop publishing firms. Useful for those who use public domain software, or networks. (security) **$59.**



CanOpener
The information retrieval utility for the Mac. Search anywhere, and lets you retrieve just about anything; including text, pictures and sounds. It even locates text inside pictures, and gives you the whole picture! Anything retrieved can be stored in it's library, so the next time you need it, it's just a click away.(utility) **$65.**

PixelPaint Professional ..... 399.
Tactic Software
Art Clips ..... 51.
SoundClips ..... 49.
Zedcor
Deskpaint 2.0 ..... 65.

HARDWARE AND PERIPHERALS

Cambridge North America
Z88 Portable Computer ..... 699.
Z88 Pocket Modem ..... 225.
Z88 512K RAM Cartridge ..... 359.
The Complete PC
Page Scanner ..... 799.
DEST
Dest PC Scan Plus ..... SPECIAL 749.

Fastkeys (SoundSight)
Speed up your computing by 50%! Bring the keyboard to your fingertips. Imagine simply pressing Fastkeys on your mouse, trackball or pad to perform everything from printing to deleting. Execute mouse operations INSTANTLY! Shift-Select is now a one hand operation as well as cut, paste, copy, quit, undo, open, close... Virtually anything you choose. (accessories) **$35.**

Silicon Beach
SuperCard ..... 129.
Softstream International
HyperHit ..... 125.
Springboard
Family Matters ..... 28.

Dolphin Subsystems (Dolphin Systems Tech)
The intelligent choice for Apple Macintosh mass storage. **Integra** Zero footprint external hard drives from 20mb-80mb capacity. **Flipper 44mb** removable hard disk high performance (25ms) offers unlimited storage and convenient portability. **Flipper 150mb** high speed SCSI tape with FlexFile/Image Backup. (disk drives) see line listings for prices.

General Computing Company
WriteMove Ink Jet Printer ..... 585.
Magnavox
Color Monitor 14" ..... 599.
Qume
Crystal Print Publisher ..... 3745.
Seikosha America
Seikosha Printer (dot-matrix) ..... 235.
Sharp
The Wizard ..... 249.
ThunderWare
LightningScan ..... 409.
ThunderScan 5.0 ..... 189.

HYPERWARE

Activision
Focal Point II ..... 117.
Reports for HyperCard ..... 69.
Bantam
Complete HyperCard Handbook .... 23.
Beacon Technologies
HyperBible International Version ... 179.
HyperBible King James Version .... 149.
BrainPower
ArchiText ..... 175.
Bright Star Technology
HyperAnimator 1.5.1 ..... 99.
ICOM Simulations
HyperTMON ..... 59.
MicroMaps
HyperAtlas ..... 59.
Power Up
HyperTutor ..... 29.
Symmetry
HyperDA 1.2 ..... 35.
TimeWorks
HyperWorks Organizer ..... 60.
Trendware Corporation
HyperTools #1 or #2 ..... ea. 52.
XCAL ..... 79.

INPUT/OUTPUT

Cutting Edge
CE-105 ADB Keyboard ..... 125.
DataDesk Intl.
Mac 101 Keyboards ..... 139.
Kensington
New Turbo Mouse ..... 109.
Koala
MacVision 2.0 ..... 219.
Kraft
ADB Joystick Premium III (SE&II) ... 51.
QuickStick ..... 39.
Kurta
IS/ADB Tablet 8 1/2 x 11 ..... 255.
Mouse Systems
A+ Mouse (512/Plus or SE/II) ..... Call.
Summagraphics
Bit Pad Plus ..... 325.

LANGUAGES

Digitalk, Inc.
Smalltalk/V MAC ..... 129.
Manx Software Systems
Aztec C or Unitools ..... ea. 65.
Microsoft.
QuickBasic ..... 65.
Shana Corporation
Inside Out ..... 369.
SmethersBarnes
Prototyper ..... 189.
Symantec
THINK'S C 4.0 ..... 165.
THINK'S Lightspeed Pascal ..... 89.
Zedcor
ZBasic 5.0 ..... 95.

MEMORY UPGRADES/ ACCELERATORS

1 MEG SIMMS
Low Profile, 100ns High Quality Single In-Line Memory Modules for MacPlus, SE, II, IIx.
2 yr. Warranty. .... **New low price $125.**

Dove (full line available)
MaraThon 030 Accelerator ..... 969.
MaraThon 030X ..... 999.
MaraThon Racer ..... 162.
MacSnap 2S ..... 319.
MacSnap 4S ..... 638.
MacSnap 8S ..... 1276.
MacSnap 524E ..... 187.
MacSnap 524S ..... 249.
MacSnap 548S ..... 479.

Acta Advantage (Symmetry)
With Acta, you can jot down your ideas whenever they occur. Later you can export the outline to a word processor or spreadsheet for more serious work. Acta outlines lists of things to do, items needed people on a project, appointments, name and address books, or any set of data you need to keep handy. Acta can sort, find, replace, mix fonts within topics, and accepts graphics too. (word processors) **$65.**

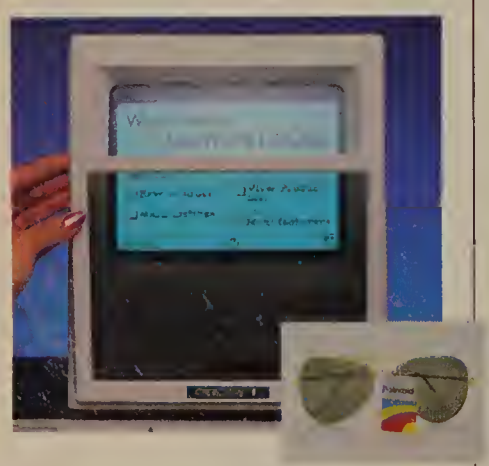
GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

MAcKNOWLEDGE (Prometheus Products, Inc.)
MAcKNOWLEDGE is the latest communications software available for your Macintosh. Icon based scripts provide instant access to all major online services with just the click of your mouse. The TAL scripting language provides all the capabilities for customizing and automating your own online sessions or the record function will watch your session and create an icon based script automatically. Also provides support of 9600 bps and MNP modems. (communications) **$149.**

MODEMS/FAX

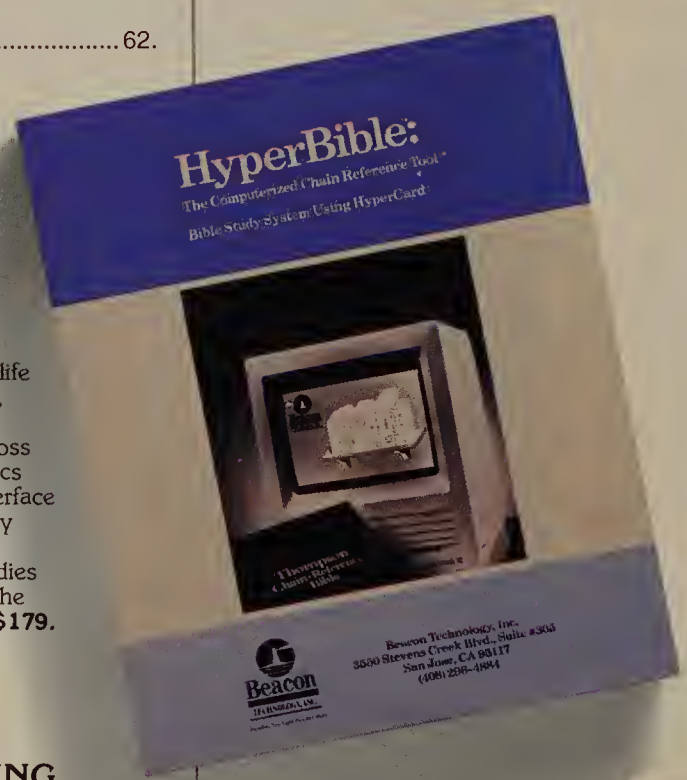
Abaton
InterFax12/48 ..... 325.
Best Data Products
SmartOne 2400/1200 ..... 145.
Hayes
Smartmodem 1200 ..... 295.
Smartmodem 2400 ..... 429.
Smartmodem 9600 (V series) ..... 985.
Orchid Tech
MacFax ..... 448.
Prometheus
ProModem 2400 SE Int. ..... 209.
ProModem 2400M ..... 199.
Supra
Supra Modem 2400 ..... 139.
US Robotics
Courier 9600 Modem ..... 699.



Polaroid Circular Polarizing Filter (Polaroid)
Improve contrast and reduce glare on virtually any computer monitor, it suppresses up to 99% of reflected light and is more effective than other kinds of filters for improving contrast. So you see clearly and with less effort. It fits directly over your Mac and attaches with velcro pads. With the purchase of a filter you get **FREE POLAROID SUNGLASSES**, a $16.95 value. (accessories) **$35.**

MUSIC AND SOUND

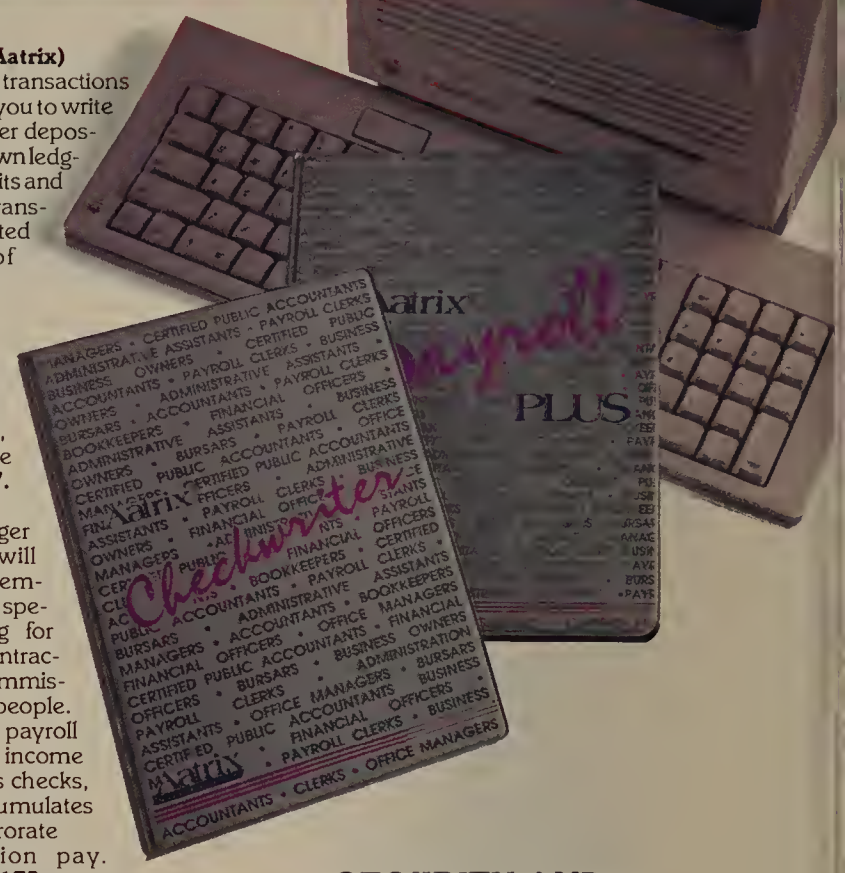
Altech
MIDI Interface ..... 59.
Bogas Productions
Super Studio Session 2.0 ..... 69.
Coda
Finale ..... 479.
MacDrums ..... 31.
Perceive ..... 50.
Electronic Arts
Deluxe Music Construction 2.5 ..... 85.
Esthetic Engineering
Music Mouse ..... 49.
Farallon Computing
MacRecorder (records sound) ..... 165.
Screen Recorder ..... 132.
First Byte
SmoothTalker ..... 33.
Great Wave
Concertware+MIDI 4.0 ..... 78.
HIP Software
Harmony Grid ..... 59.
Intelligent Music
OvalTune ..... 95.
Passport Designs
Master Tracks Pro 3.0 ..... 259.
NoteWriter ..... 189.
Passport MIDI Interface ..... 95.
Primera Software
Different Drummer ..... 59.
Repertoire
Music Publisher ..... 375.
Resonate
Listen 2.0 ..... 62.



HyperBible (Beacon Technology)
The Computerized Chain Reference Tool puts a new life into your study of the Bible, using hypercard's interface. Over 100,000 notes and cross references, Atlas, 7000 topics and Glossary of terms. Interface to any word processor. Easy word and phrase search of scripture. Ready made studies for meetings. Available in the New International Version **$179.** or the King James Version (hyperware) **$149.** Great gift items.

NETWORKING PRODUCTS

Connect Inc.
MacNet ..... 47.
Dove
FastNet SCSI ..... 749.
FastNet II ..... 565.
FastNet III ..... 375.
FastNet SE or SE/30 ..... ea. 375.
Farallon
Timbuktu 3.0 ..... 95.
Timbuktu Remote 1.0.1 ..... 195.
TrafficWatch ..... 135.
PhoneNET PLUS ..... 35.
PhoneNET Repeater ..... 325.
PhoneNET Star Controller ..... 1095.
Microcom Software
Carbon Copy Mac ..... 119.
Shiva
NetBridge ..... 349.
NetSerial X232 ..... 279.
TOPS
NetPrint ..... 119.
FlashBox ..... 125.
FlashCard ..... 159.
Repeater ..... 129.
Teleconnectors ..... 29.
TOPS ..... 145.
TOPS DOS ..... 115.



Checkwriter (Aatrix)
Enter recurring transactions and it reminds you to write checks and enter deposits. Print your own ledgers, debits/credits and tax sheltered transactions. Unlimited number of checking accounts and transactions per account. Lets you design your own check and stub, and will write them too! **$37.**
Payroll Plus
Made for larger companies; will handle many employees, plus special accounting for restaurants, contractors, and commissioned sales people. Can manage payroll from up to 10 income sources. Prints checks, itemizes, accumulates O/T and can prorate sick / vacation pay. (accounting) **$175.**

SECURITY AND VIRUS PROTECTION

ASD Software, Inc.
FileGuard 2.0 ..... 129.
TWINS ..... Call.
HJC Software, Inc.
Virex 2.1 ..... 59.
Kent Marsh
MacSafe or NightWatch ..... ea. 87.
QuickLock ..... 57.
Mainstay
AntiToxin ..... 65.
Symantec Corporation
S. A. M. ..... 69.

SPELLING/DICTIONARY THESAURUS CHECKERS

Deneba Software
BigThesaurus ..... 59.
Spelling Coach Pro ..... 115.
Electronic Arts
Thunder II ..... 52.
Lexpertise
MacProof 3.2.1 ..... 115.
Microlytics
Electronic Word Finder ..... 75.
Word Finder 2.0 ..... 36.
Sensible Software
BookEnds or Sensible Grammar ..... 53.

Casino Master (Centron)
Become a Master of Casino Gambling! Five separate casino games include **Blackjack Ace, Crapsmaster, Roulette Master, Pokermaster, and Baccarat Master.** Exact table simulation, betting, bankroll, stored win/lose statistics and manual included. Now in dazzling color on the Mac II!! Recommended and used by professional gamblers! (entertainment) **$27.** each game or 5 game Casino Master Package for **$49.** or Deluxe Mac II color version for **$55.**

CompuServe®

You can now contact MacWAREHOUSE or place orders with us in the **Electronic Mall** on CompuServe. The **MacWAREHOUSE GO code** is **GO MW**. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

DiskFit 1.5 (SuperMac)
A handy utility for backing up your hard disk on a series of floppies. It saves time because it backs up only those files which have had changed since the last backup. DiskFit can verify each floppy after copying files onto it, so you know that your files are safe. Diskfit also discards old versions of files so your backup set doesn't keep growing. Version 1.5 supports a variety of cartridge tape drives, including the Apple tape backup system. (utilities) **$59.**

STATISTICAL ANALYSIS

Abacus Concepts
StatView II ..... 295.
StatView SE+Graphics ..... 225.
BrainPower
StatView 512+ (requires 512k) ..... 149.
D2 Software
MacSpin 2.0 ..... 189.
Odesta
Data Desk Professional ..... 289.
Paracomp
Milo ..... 159.
Select Micro Systems, Inc.
Exstatix ..... 219.
Wolfram Research
Mathematica (SE) ..... 450.

UTILITIES

Abbott Systems
CanOpener ..... 65.
Affinity
Tempo II ..... 79.
Aladdin
Programmer's Assistants ..... Call.
Shortcut ..... Call.
ALSoft
DiskExpress II ..... Call.
Font/DA Juggler ..... 42.

1 Meg SIMMs
New Low Price! Increase your Mac's power - at a fraction of the cost of a new computer with these low profile 1 MB SIMMs. Each SIMM comes with a one-year manufacturer warranty. Adding memory doesn't require technicians in lab coats. Just open your Mac, slide out the main circuit board, and plug in you memory cards. (special $15 Mac Tool Kit available to open your Mac Plus or SE) (memory) **80ns $145. or 100ns $125.**

MasterDisk ..... 49.
Master Juggler ..... 64.
Berkeley System Design, Inc.
Stepping Out II ..... 50.
CE Software
DiskTop 3.0.2 ..... 32.
QuicKeys 1.2 ..... 65.
Caere
OmniPage ..... 559.
Central Point Software
Copy II Mac (with MacTools) ..... 24.
PC Tools Deluxe For Mac ..... 46.
Dantz Development
Retrospect ..... 155.
Emerald City Software
Lasertalk 1.0 ..... 187.
Fifth Generation
FastBack II ..... 108.
PowerStation 2.5 ..... 35.
Pyro ..... 15.
Suitcase II ..... 45.
GO Technologies
MacTree Plus ..... 46.
ICOM Simulations
On Cue ..... 35.
Insight Development
MacPrint ..... 79.
Magic Software
AutoSave II ..... 29.
BackMatic ..... 50.
POWERICONS or POWERmenus ea.39.
Mainstay
Capture 2.0 ..... 49.
Microlytics
GOfer ..... 47.
Olduvai
MultiClip ..... 51.
PCPC
HFS Backup 3.0 ..... 54.
Peripheral Land, Inc.
TurboBack ..... 49.
TurboCache or Turbo Spool ..... ea. 59.
TurboOptimizer ..... 25.
Preferred Publishers
Exposure ..... 55.
SuperMac
DiskFit 1.5 or SuperSpool 5.0 .... ea. 59.
Sentinel 2.0 ..... 89.
SuperLaserSpool 2.0 ..... 89.
Symantec Corporation
SUM II ..... 65.
Tactic Software
ClipShare ..... 139.
FontShare 2.0 ..... 149.
Williams & Macias
DiskFinder ..... 29.
myDiskLabeler ..... 34.
StickyBusiness 1.07 ..... 95.
XTree Company
XTree Mac ..... 58.

WORD PROCESSORS AND OUTLINERS

DeltaPoint, Inc.
MindWrite 2.1 ..... 95.
Ashton-Tate
FullWrite Professional ..... 259.
Claris
MacWrite II ..... 185.
Microsoft
Word 4 ..... 249.
Niles & Associates
End Note ..... 75.
Symmetry
Acta Advantage w/DA ..... 65.
T/Maker
WriteNow 2.0 ..... 109.
WordPerfect Corp.
WordPerfect ..... 189.
Working Software
QuickLetter ..... 73.

CONTEST RULES 1. Entries must be received on or before 1/31/90. 2. Winners selected in random drawings by attorneys for MicroWarehouse Inc. (MWH), whose decisions are final. 3. NeXT Computer prize subject to availability. MWH reserves the right to substitute wholesale cash value up to $10,000. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. All prizes will be awarded. 6. MWH will announce the winners on or around 2/28/90. Winners notified by mail. Dates subject to change at the discretion of MWH. If unable to contact any winner, an alternate will be selected by random drawing. 7. Contest is open to US residents, except where prohibited by law. Employees of MWH and suppliers not eligible. 8. Prizes - one Next Computer including keyboard and monitor and 150 software and media prizes.

Circle 78 on reader service card

STOP PRESS

NEW!
Price breakthrough!
Under the Mac Drives (Cutting Edge)
The Cutting Edge Under the Mac Drive hard disk drives are quiet and reliable with access times down to 20 milliseconds making it almost three times faster than most. Push button external SCSI address switch and removable SCSI terminators allow easy daisy chaining up to 7 SCSI devices. Sizes available 20 megs to 80 megs (disk drives)
20 meg only $439.
30+ meg only $499.
45+ meg only $549.
65+ meg only $629.
80+ meg only $739.

800K Drive
The Cutting Edge 800K drive's attractive styling, quiet performance, and high-tech reliability make it our most popular floppy drive. Features an LED light to indicate disk access and a hinged door over the disk insertion slot to keep the mechanism clean. One year manufacturer's warranty. (disk drives) **$149.**

Talk to Kerry - FREE on CompuServe®!

Now you can contact MacWarehouse™ or place orders with us in the Electronic Mall on CompuServe®. And there's no time charge October 15 thru December 31.

The MacWarehouse™ Go Code is GO MW. As always, you'll get fast, dependable, overnight service and you can leave messages for Kerry or any of our support staff.

And if you're not yet a CompuServe subscriber, MacWarehouse brings you this exclusive offer:

SAVE $30.00
CompuServe subscription kit — just $9.95

You save $30 off the regular retail price AND get $25 worth of free CompuServe time, plus free access to the MacWarehouse™ store October 15 thru December 31. The subscription kit also includes the 250 page user manual.

CompuServe puts an on-line database at your service. You can search its files for any information you need - complete text from major publications, encyclopedias, stock data, book and ,movie reviews, etc.

There's never been a time like now to join CompuServe

To order call Kerry at:

MacWAREHOUSE
1-800-255-6227

Tomorrow's Upgrade For Your Mac Is Only $125.*

A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You don't even need a soldering iron. Just open your Mac, slide out the main circuit board, and plug in your memory card. Complete installation instructions are included with each memory kit.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@ $125).

The chart explains exactly what you need to achieve the desired level of performance.

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The Dirt on Apple Security

Fighting loose lips, missing code, and probing garbologists

by Steven Levy

Apple's legendary "1984" commercial ran only once on network television. The exit line on this bit of advertising history, in case you somehow forgot, went like this: "On January 24 Apple Computer will introduce Macintosh. And you'll see why 1984 won't be like *1984*." Well, roll over, George Orwell. There's a new Apple advertising campaign, and it's not directed at prospective computer buyers. It's aimed at the people who design, manufacture, sell, and support Macintoshes: Apple's employees. Its goal is to generate a corporate wartime consciousness within the previously mellow Apple culture. It's a lot like what Michael and Elliot, those yuppie admeisters of "thirtysomething," would have come up with if asked to design a campaign for the KGB.

The campaign is witty, at least judging by the photos in the internally distributed newspaper devoted to the Apple Information Protection Program (IPP). There is a picture of John Sculley, his grinning head sticking out of a pile of spaghettied documents. "John Rips New Organization to Shreds," it says, making light of Sculley's hobby of reshuffling Apple's hierarchy as often as a blackjack dealer mixes the deck. In small print it urges Appleniks to "use shredders and confidential bins." Then there's lame-duck executive Del Yocam, sitting with knife and fork—and a gag around his face. In another layout, one of Apple's first employees, Chris Espinosa, is pictured holding his hands over the ears of his mom, fellow Appleworker Sue Espinosa. "There Are Some Things Even Your Mother Shouldn't Know," it says, adding that even pillow talk with "significant others" should be discreet. And most impressively, there is Jean-Louis Gassée, decked out in punk sunglasses and a black leather jacket, pointing at a circuit diagram stamped "Confidential." The legend under this picture attempts to explain the baffling distinctions between Apple's various levels of confidential information.

DAN ESCOBAR

Apple dumpster diver Chuck Farnham

More ominously, there is also a full-page spread covered by the boldface names of more than 100 employees who have volunteered to be information protection coordinators. "Every department should have one," says the message underneath the names. Presumably these "ambassadors" to the IPP are to aid fellow workers in keeping the secrets. "There are a thousand things" an Apple employee can do: ten examples are given. They include instructions not to speak to journalists without specific authorization, to get passwords installed on computers and voice mail, and to accost "unfamiliar people who are lingering in your area," in case they may be . . . well, who knows *who* they may be. You get the idea.

LIFE DURING WARTIME

The Information Protection Program might appear to be a sign that Apple Computer is getting somewhat paranoid, or at least tense in the buttocks, at the onset of its middle age. But consider its opposition: the emergence of something called the nuPrometheus group, which has borrowed its name from that Greek dude who brought us fire. In this case, program listings and comments for the Macintosh ROMs have been distributed to the press, perhaps in hopes that the liberated information might inspire others to make great products that Apple may no longer be planning. The first salvo was bona fide source code for Color QuickDraw: if not the crown jewels, a close approximation.

It was a guerrilla action, presumably against Apple's increasing regimentation and information-hoarding practices. As one ideological ally of the nuPrometheus bunch put it to me, this is a battle between "the morons running around in suspenders," who make up Apple management, and "the guys they keep in closets," who actually design the products and make up the real heart of Apple Computer.

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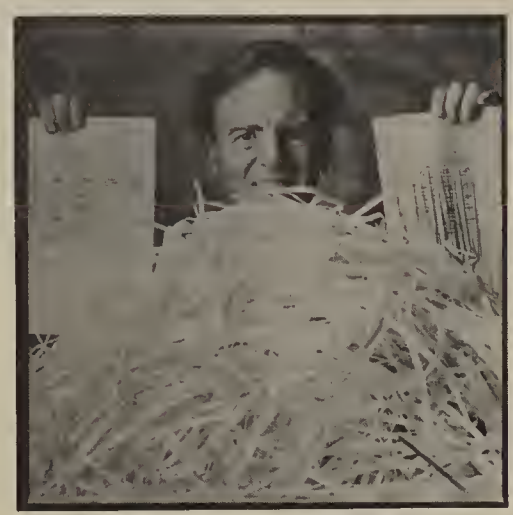

JOHN RIPS NEW ORGANIZATION TO SHREDS.

DEL DEMONSTRATES THE ETIQUETTE OF DINING OUT.

JEAN-LOUIS ON ZE ROMANCE OF CLASSIFYING INFORMATION.

Seen in this light, the Information Protection Program ís more than your normal "Loose Lips Sink Ships" propaganda campaign. It is management's attempt to retain the hearts and minds of its employees during an era in which Apple can no longer rightfully claim to be a little guy, but is an unmistakable giant, matching its technical efforts with vigorous legal machinations designed to intimidate fellow giants and squash little guys who might one day impinge on Apple turf.

Apple's director of corporate security is a former FBI operative named Ken Moore. Until a few years ago, he headed security for United Airlines, where the worst-case scenarios he worked with included murderous terrorist attacks. His worries now are not as dire, but no less challenging: he must turn around a corporate culture in which keeping secrets, shredding papers, and other security measures are regarded lightly. To date, the unofficial theme song of Apple has been "Yakety Yak." But despite Apple's reputation as the sieve of Silicon Valley, the company managed to become one of the biggest success stories in American history. It can even be argued that Apple's openness has been an integral part of its success. Apple, after all, has benefited mightily from a freewheeling flow of information within the company and its developer community. If Moore's efforts overly inhibit that, the net result will be stagnation. Something beneficial will have been lost, and though it won't be easily identified on a financial accounting, its long-term effects would be decidedly negative for both the company and its customers.

Moore says that he respects Apple's culture and wants to work within it. "I don't want to do away with openness," says Moore. "We want to change behavior without stifling creativity." He claims that the IPP has engendered little resistance at Apple; to the contrary, he says, "People have asked, 'What took you so long?'" The nuPrometheus caper may have helped Moore's quest for acceptance. "Apple culture is a feeling of family," he says. "If a leak occurs in a newspaper or anything else, there's a reaction of anger. . . . It's hurting your buddies."

DEVIL IN THE DUMPSTER

Strangely, even some of the most strident critics of Apple's increasing conservatism agree with Ken Moore. Which brings us to Chuck Farnham, perhaps the premier representative of a group of career gadflies who buzz around Apple, seemingly to bedevil the company by spiriting its secrets out into the public domain. In Farnham's own words, he's an ally of Apple, "just a guy who likes the machine." Yet he seems to take particular pride in the fact that many people at Apple hold him in greater disregard than stinging insects or food poisoning.

One of Chuck's hobbies is garbology, which he practices in various dumpsters outside of Apple buildings. He is not squeamish about getting his hands dirty in the cause of obtaining information that Apple holds dear. It was Farnham, for instance, who pulled off what he calls The Four Blind Mice Caper—smuggling and distributing the documentation for Apple's laptop computer, months before its release. A follow-up work in progress is a documentary about breaching Apple security. I'm told it includes some really nifty dumpster shots.

Farnham reminds me of the cyberpunk-style hackers who break into protected computer systems and then complain that it wasn't challenging enough—it offends them that even stupid people can do it. "I would like to see it be not as easy as it is to get information out of the company," he says. "It's ridiculously easy. For instance, eight months before HyperCard came out, I got 10MB of development code for the program from a secretary's hard disk drive. When she got a new SE, she sold the drive, forgetting to erase the contents, and someone outside the company bought it. Within five days the drive was in my house."

(continues)

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AL GIVES SOME FREE LEGAL ADVICE.

As Apple's acting general counsel, senior vice president Al Eisenstat talks about the law, common sense, and confidentiality.

Other things that bother Farnham include the fact that he has purchased Apple security badges at a flea market for a buck apiece. And that he often visits supposedly secure Apple sites without having his bags checked.

After talking to Farnham, the suggestions in the IPP newspaper to erase all disks after use and shred all papers no longer sound slightly threatening and borderline paranoid. There *are* bogeymen out there. Farnham himself supports the Information Protection Program: "There should be [security] education for Apple employees," he says.

But obviously Ken Moore's problems go beyond education. He is eager to stop the Chuck Farnhams and especially the nuPromethians. But how far should he go to root out all evil? Security mania at Apple is in full swing: Cupertino checkpoints are guarded more diligently than at any time in Apple history. Employees are encouraged to utter but two words to inquiring journalists—*no comment*—even on the most innocuous of queries, before referring them to the public relations department. Informal communication between various departments of Apple, formerly a wellspring of creative ideas, is limited to situations of "need to know." And the idea that a large number of employees are encouraged to report on the activities of others has engendered a black sort of humor in which the company is referred to as Little China.

The danger of an Information Protection Program, in concert with these other measures, is that Apple's reputation will change—from that of an irreverent, free-wheeling company to that of a cautious giant—and the best and brightest will no longer want to work there.

THE RAMSEY FILE

Of course, the Information Protection Program really doesn't deal with the issue of what happens when employees knowingly leak information. In some cases, the leaks come from top executives. In others, like nuPrometheus, there is that pesky ideological component. The perpetrators probably think that in some weird way, releasing confidential data is helping Apple. "That's a rough one to fight," Ken Moore admitted, before the vigilant public relations operative monitoring our phone conversation shut down that line of questioning. Moore would not comment further on the search for the nuPromethians. Nor would he comment on the case of David Ramsey.

This is a shame, because the Ramsey case is the most distressing signal yet that security mania at Apple may prove destructive to the firm. Ramsey is a programmer, best known for his work on MacPaint II, who toiled for an Apple systems software group. But he was well known in the Macintosh community as someone who devoted endless hours of his own time to the Mac user group on CompuServe. To many he was the only person at Apple available to answer questions about the products on which they spent their money. One day, in a scene out of Franz Kafka, Ramsey was called on the carpet for some remarks he made in a CompuServe message. Apparently, the comment dealt with an unannounced Apple product.

"I had been watching myself," says Ramsey. "I thought I was on safe ground with the comment. It was information that an Apple executive had already said [publicly]." Ramsey said that after he

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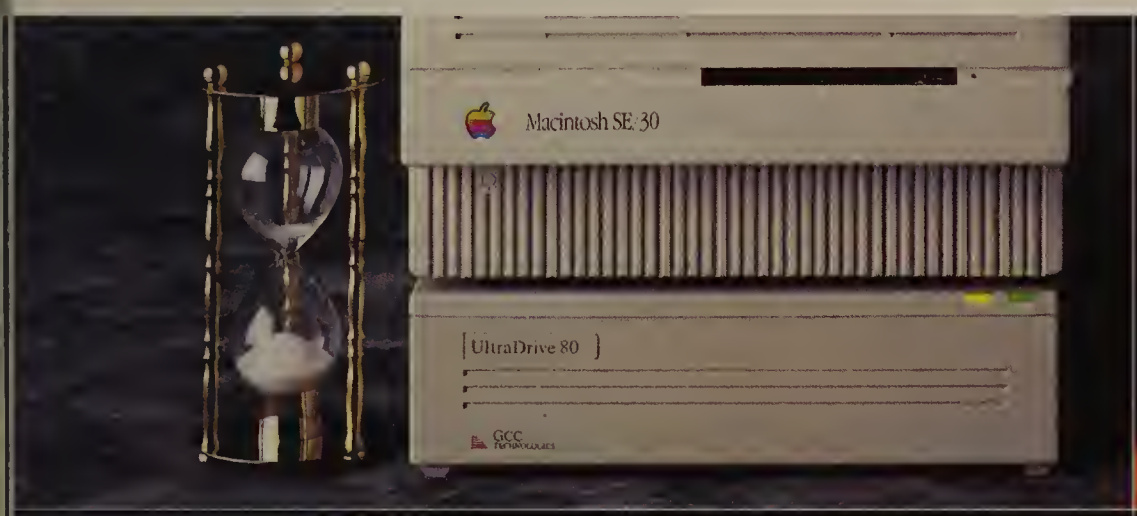

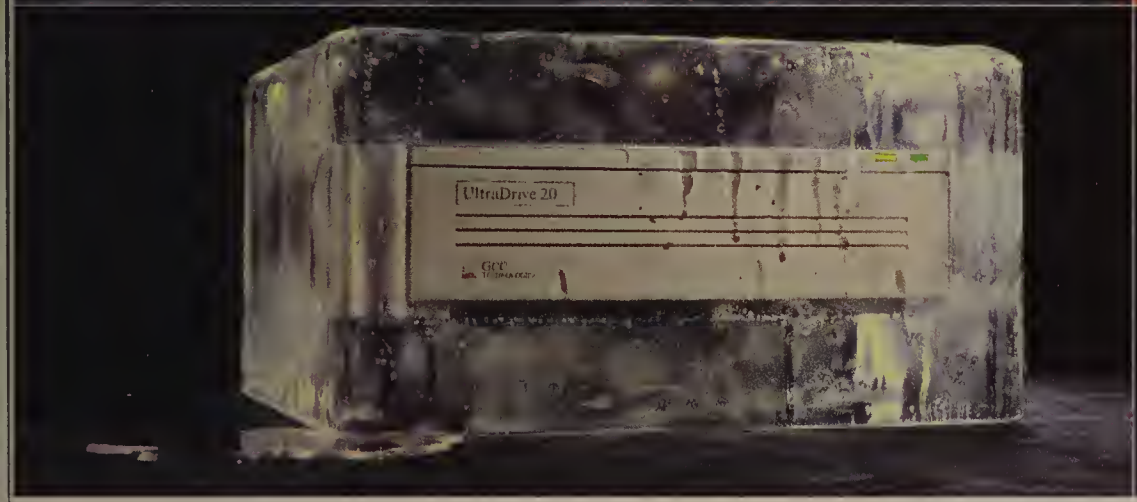

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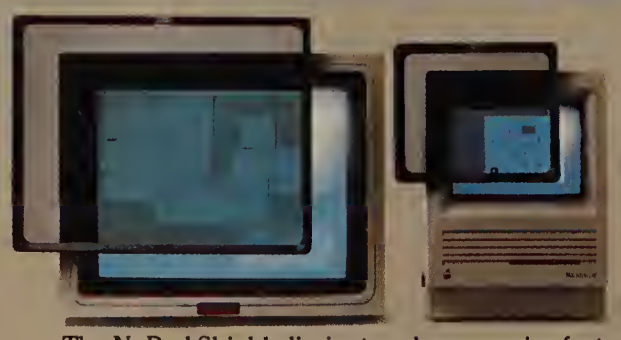

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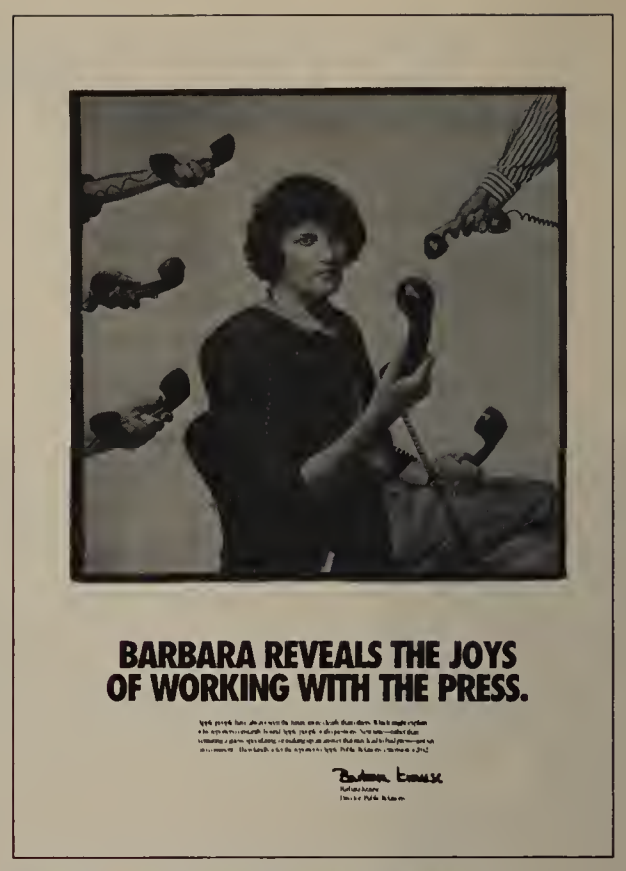

Public relations director Barbara Krause asks employees to just say "no comment" when hounded by reporters.

admitted making the comment, Apple suspended him from work for two weeks. At the end of that time, his employment was terminated. He does not know precisely who at Apple ordered the firing.

Ramsey is still loyal to Apple and hopes to return there one day. He has agreed not to repeat whatever comment it was that got him fired so precipitously.

Some of Ramsey's supporters have reacted with outrage, vowing never to buy Apple products if they can avoid it. Ramsey himself shrugs off the more extreme responses. He speculates that the reason he lost his job was simply "bad timing." It seems Apple made an example of David Ramsey.

Is the Ramsey firing an aberration? Or is it the dark side of those funny pictures in the Information Protection Program newspaper? Friends of Apple, myself included, fervently hope the former. Otherwise, we await the resurrection of George Orwell to document the next chapter of the history of Apple Computer. M

Steven Levy is a Macworld *columnist and the author of* The Unicorn's Secret: Murder in the Age of Aquarius *(Prentice-Hall Press, 1988).*

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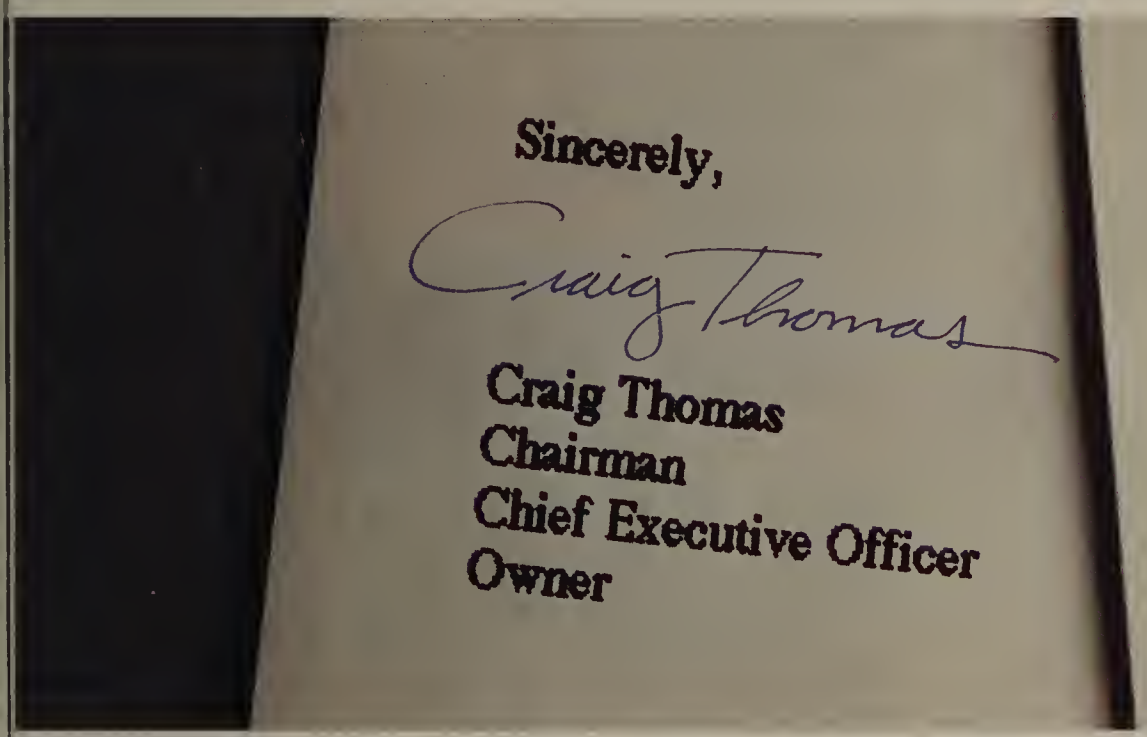

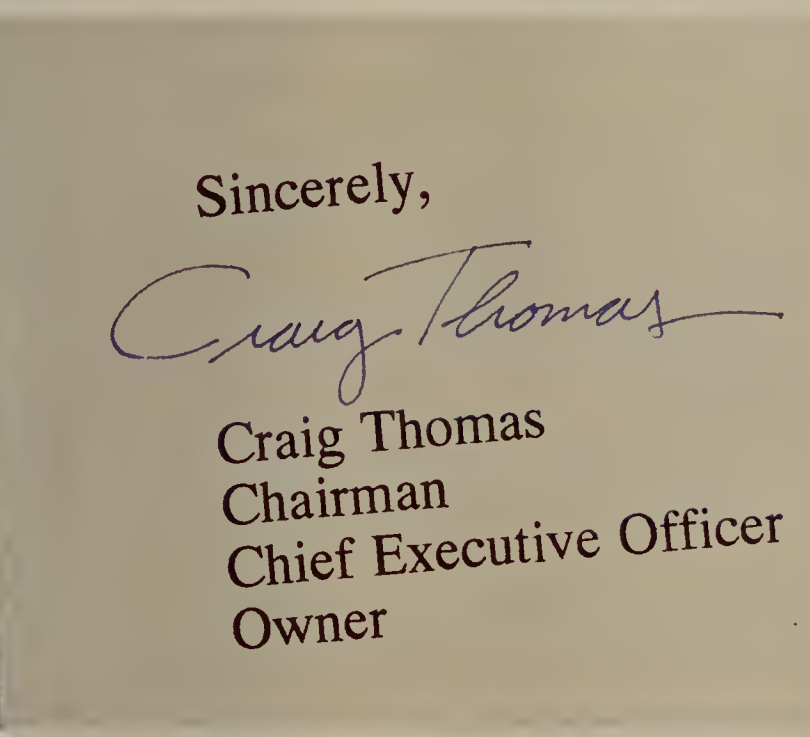

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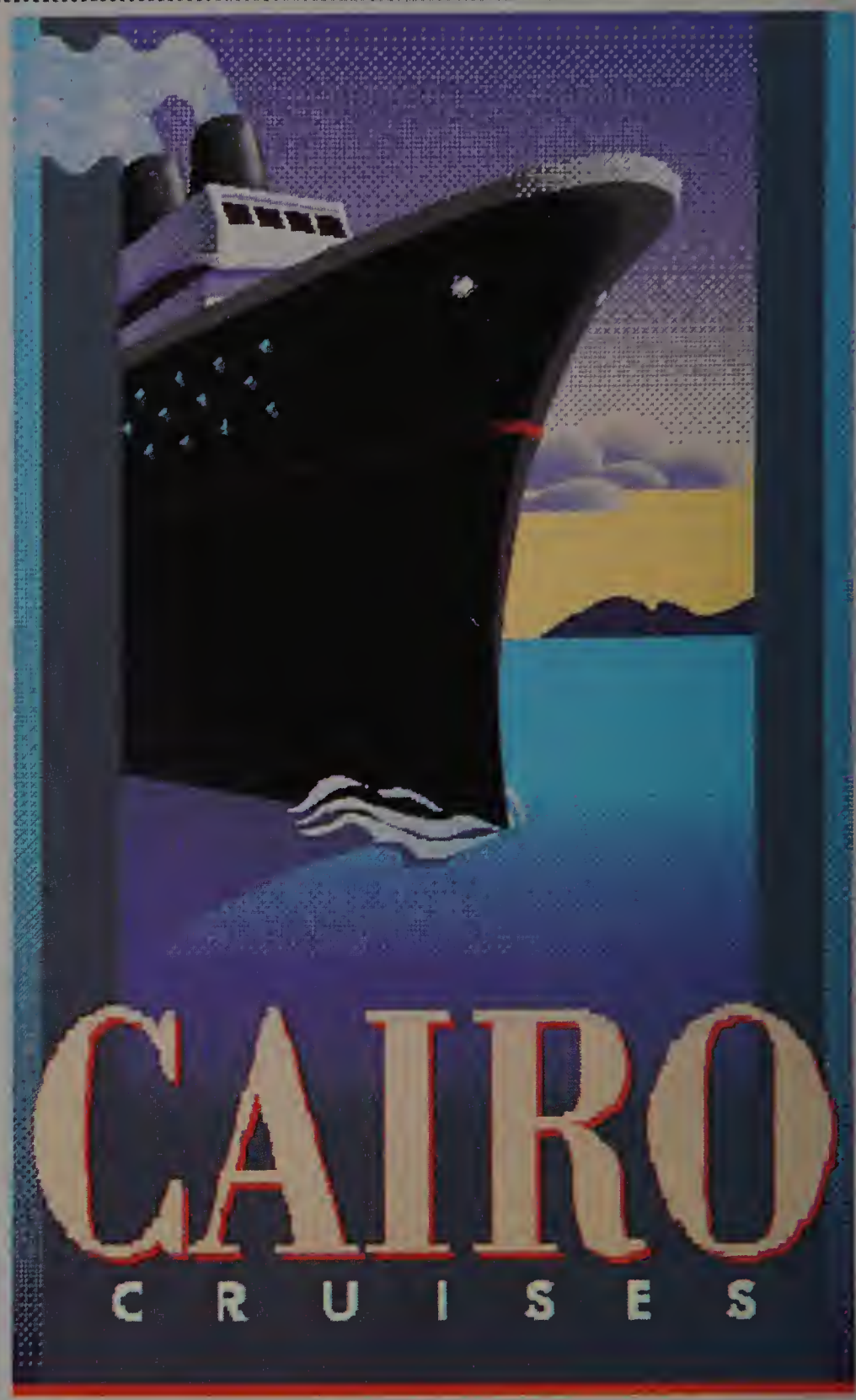

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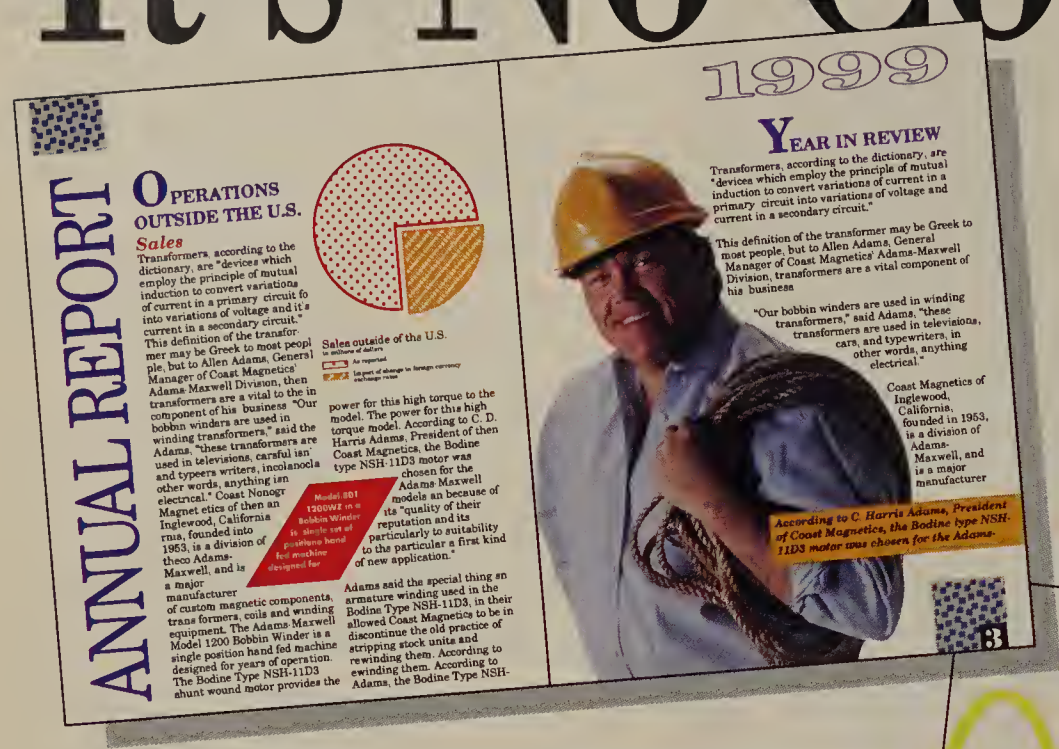

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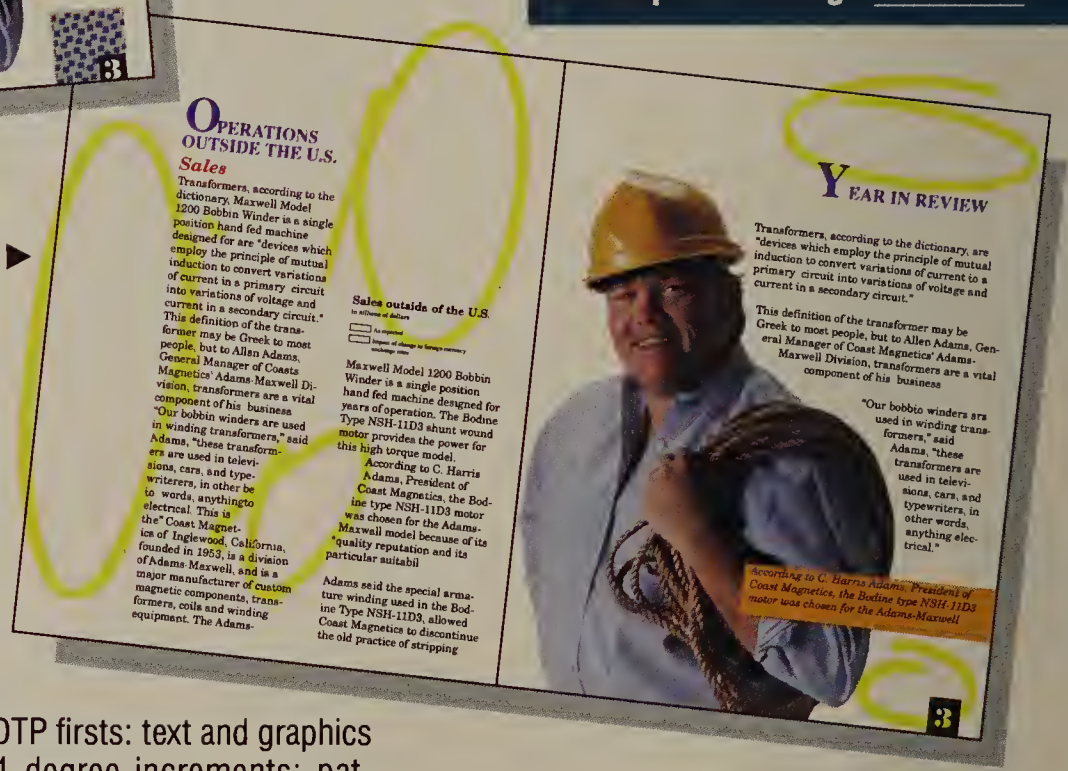

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All the News That Fits

The Macintosh News Service wins fans

by Deborah Branscum

"In user groups a handful of people usually do all the work," says Don Rittner, president and newsletter editor of the MECCA user group in Albany, New York. At a national gathering of user groups last year, "a bunch of us stood around complaining about how hard it was to get stories for our newsletters. After talking to all these people, I decided we needed a UPI or AP for the user group community." Thus Rittner launched the Macintosh News Service (MNS) in July of 1988, despite a full-time social service job.

The disk-based service is sent to more than 1000 user groups in ten countries free of charge. Each disk includes shareware and public domain programs, news picked up from Rittner's bulletin board perusals, and about 15 articles. "The large groups in urban centers don't need MNS," says Rittner. "It's really for the other 90 percent of user groups, those with 50 to 100 members."

It was logical to fashion MNS as a clearinghouse for the best articles from the hundreds of user-group newsletters Rittner receives every month. But there's original material included as well. In July, for example, graphic artist Fred Showker began creating clip art and graphics tips exclusively for MNS. MNS is not an inexpensive operation, but Rittner didn't want to charge user groups for the service. Instead, he asked companies to sponsor the service. User groups that use MNS material agree to run an advertisement for the sponsor or credit the company in their newsletters. The groups also agree to add the MNS disk, which includes a text file from the vendor, to their public domain libraries. In return, a company picks up the tab of several thousand dollars for compilation, disk duplication, postage, and small payments to the writers and artists who contribute the original material.

"It's saved the club a considerable amount of money," says Bill Chenault, until recently the newsletter editor of the Panhandle Macintosh User Group in Pensacola, Florida. MNS "has been a godsend for us and some of the smaller clubs. We haven't had a newsletter go out without some of his material." Like other editors he knows, Chenault was happy to find a consistent source of articles.

Seven sponsors have aided MNS so far, including Acius, Irwin Magnetics, and Berkeley Systems. "It's a good way for a small company to reach 300,000 Mac users overnight," says Rittner, who hopes MNS will become a monthly operation.

Trained in archaeology and environmental sciences, Rittner used a Mac several years ago to help save many acres of fragile pine barrens land in New York threatened by development. And now that the MNS is established, Rittner is launching a new project. This time it's the Johnny Appleseed Awards to recognize Macintosh user groups that make outstanding contributions to their communities. "I'd like to be able to take the community spirit that's in the Mac world and stimulate the user groups to take the technology of the Macintosh and use it for those people who need help," says Rittner.

Rittner is counting on the industry to donate cash and products to recognize humanitarian efforts among users; he's counting on users to respond to the challenge. The panel of judges for the awards includes Guy Kawasaki of Acius, Marci Glickman of Ashton-Tate, graphic artist Showker, and Rittner himself. The first awards event is scheduled for next April at Macworld Expo; nominations for awards will be accepted through the end of January.

Don Rittner can be reached at 518/374-1088 (BBS: 518/381-4430) for information about the MNS or the Johnny Appleseed Awards.

APPLE FIXES SOME FLAWS

If your ImageWriter LQ is having printing problems (at the top and bottom 1½ inch of the page) or noise trouble (when printing dense graphics, for example), Apple will pick up repair costs if the printer's serial number is below 183101013. That's the good news. The bad news is that

(continues)

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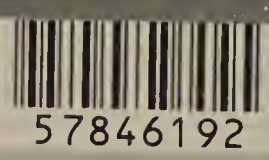

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NOVEMBER

APPLE WARRANTY WATCH

71 *Months of Inadequate Warranty*

people who had their LQs fixed or who bought so-called enhanced LQs between February and April may have received bad ROM chips that can cause stopping or reset problems when used on a network. Dealers will replace the main circuit board at no cost if that's the case. Additional bad news: some users have experienced a lengthy wait for LQ repairs.

In case you missed our Mac Bulletin item in September, let me repeat the message for owners of Apple 40MB hard disks that won't boot properly. Dealers will replace your internal 3½-inch drive at no cost if the serial number falls within the range of 335507 to 1023016. And, happily, Apple will reimburse customers who have paid for repairs outside of warranty; call customer relations at 408/252-2775 for details.

ATTENTION HYPERDRIVE OWNERS

Remember the old days when Macs had no SCSI ports? If you own an aging HyperDrive from GCC Technologies, please note that the company offers a trade-in program. Anyone who owns an internal HyperDrive 10, 20, or 2000 can upgrade to another GCC hard disk for at least 40 percent off the retail price. GCC says it wants to offer its early customers an upgrade path to SCSI technology. "As long as it has not been tampered with, any complete HyperDrive will be accepted under this program, even units that are no longer functioning," according to the company. Prices vary, depending on the model you want. For example, the trade-in price for an UltraDrive 20 is $419, a savings of $130 over the direct price listed in GCC's catalog. An UltraDrive 45 goes for $519 under this program, a savings of $180. An UltraDrive 80 sells for $719, a savings of $230. And an UltraDrive 155 is priced at $1189, $310 less than the direct price. Other models are available. Call the company at 800/422-7777 for details.

NOVEMBER EVENTS

The San Diego Computer Society is hosting its Tenth Anniversary Fair on November 4 and 5 at the Scottish Rite Temple. The fair, called Dazzle '89, will feature a strong Mac presence at demos, seminars, and booths. A blood donation or $5 gets you in. Call Chita Jing at 619/264-9910 for more information.

Build Boston '89 will feature four seminars sponsored by the Boston Society of Architects Macintosh User Group. The seminars ($55 each) cover the international architects office, desktop publishing (one basic, one advanced), and using the Mac in project management. This building-trades show, held November 15–17 at the World Trade Center, in Boston, will also include a Mac Village with third-party engineering, architecture, and business products. In addition, three speakers will enliven the first annual MUG Social, slotted for the first day of the show. Call the Boston Society of Architects at 617/267-5175 for more information.

Apple Professional Exchange (APX) is sponsoring a multimedia extravaganza on November 30 at the Macintosh Business Conference and Exposition in Long Beach, California. The APX portion of the show will feature panels on multimedia in corporate training and in presentations. Executives from MacroMind, Paracomp, Farallon, and other leading multimedia companies are expected to take part. For more information call Mike Bailey at 408/745-0665.

MUG ROUNDUP

What? We're not perfect? Afraid not. It seems some user groups were left out of the directory that ran in September because we couldn't reach them. Here are a

"I've got to get
to the type shop."
"Boy, are my feet killing me."
"What do you mean
the printer doesn't deliver?"
"Oh no! I'm late for my meeting
with the illustrator."
"If they don't have
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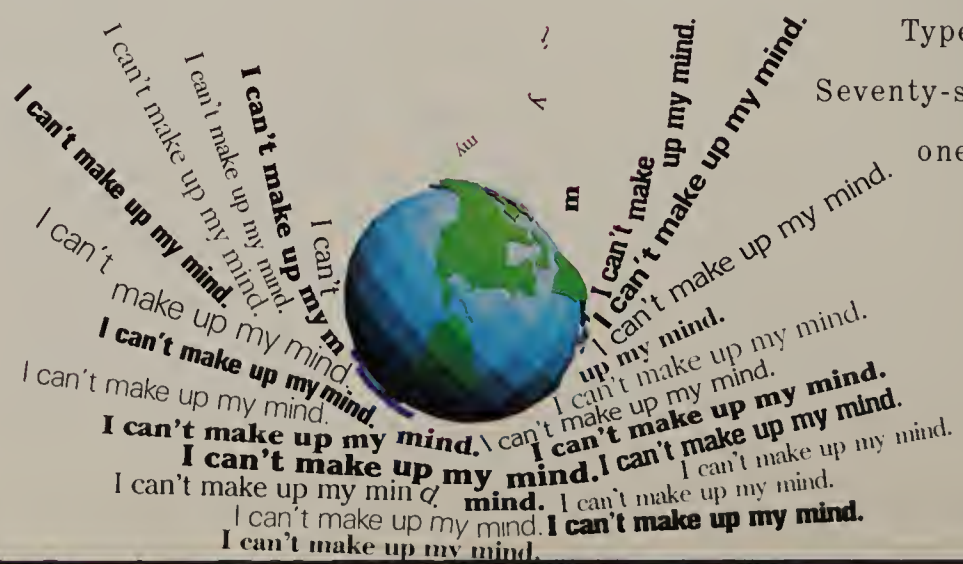

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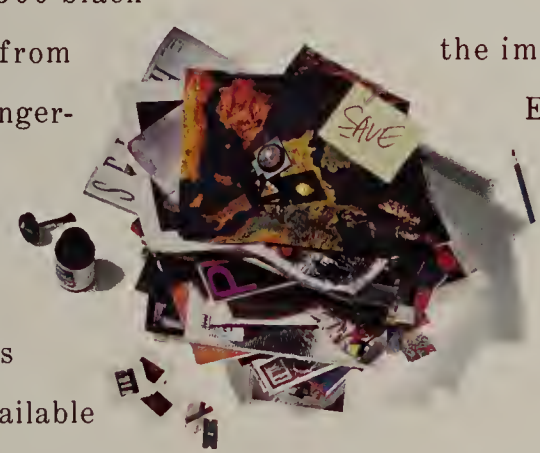

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It's almost time to get up on your feet again.

After all, you don't have CD-ROM yet so there's probably something you have to run and do. However, you should realize by now that there's only one place you really have to sprint.

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SERVICE HEROES

Shreve Systems receives good marks for excellent service from reader Dennis M. Brown of Dayton, Ohio. The company "bought my old Mac, quoted me the best price, and had a check to me ten working days after I shipped it. No hassles, no disagreements on price, only a good experience." Brown says that's how business is supposed to be but rarely is.

Another reader offers plaudits for Silicon Beach Software's fine technical support via phone and fax. "From the time I called with my problem to the time the solution was in my hand was only a matter of hours, and I was able to complete the project with plenty of time to spare," writes Dennis B. Appleton of Hewlett, New York. "It is nice to know that some companies offer customer service that doesn't make a mockery of that designation."

few of the MUGs we overlooked; others will follow in future columns.

DeMac can be reached at 400 Nut Tree Dr., Deland, FL 32724.

The Lehigh Valley Mac User Group is available c/o Barry J. Silver, 71 W. Ettwein St., Bethlehem, PA 18018; 215/691-1125.

MacNexus, the Sacramento Macintosh User Group, threatens to burn a Mac (512K or lower) on my doorstep if I don't include them in the next listing. Get in touch with the group at P.O. Box 163058, Sacramento, CA 95816; 916/446-2411, or via AppleLink at UG0003.

NASA Area Macintosh Users claims to be the best group in the Houston area. I can't vouch for that, but I can now provide an address: 403 NASA Rd., One East, #384, Webster, TX 77598. Brian Hall, the group's treasurer, librarian, and sysop can be reached at 713/644-0506.

Apple ambassador Paul Rego can be reached at 904/743-8628 for info about the North Florida Mac Users Group, P.O. Box 10262, Jacksonville, FL 32247.

The venerable Santa Barbara Macintosh Users Group can be contacted at P.O. Box 2035, Goleta, CA 93118, or by calling Morris Herman at 805/967-8280.

The Shore Area Macintosh Desktop Publishing Association concentrates on, you guessed it, desktop publishing. Co-chairs Don Stier and Marshall Makstein can be contacted at Keptel Corp., 56 Park Rd., Tinton Falls, NJ 07724; 201/389-8800.

The Macintosh SIG of the Tucson Apple Core meets on the fourth Tuesday of the month. Call Mike Peterson at 602/794-3258 for details.

And let us not forget—again—the Worcester Mac Users Group, RR 1, Box 47, East Douglas, MA 01516; 508/476-7014. You can also reach the group via AppleLink UG0199.

My apologies to anyone else we missed inadvertently; please get in touch.

NEW PHOENIX BUSINESS GROUP

Recently the Arizona Apple User Group (AzApple) launched a business offshoot called AzBUG. Monthly meetings held in the afternoon are expected to appeal to general business users, but the group hopes to bring in users from large corporations too. Call AzApple's at 602/277-8511 for information about both groups.

CONGRATS FOR USER GROUP AWARDS

Belated but heartfelt congratulations to the user group publications that won awards from the Intergalatic User Group Officers Conference some months ago. The winners, please: The Madison Macintosh Users Group, the Central Kentucky Computer Society, the Pioneer Valley PC User's Group, the Madison PC Users Group, BMUG (which won two awards), the Computer Society of South Jersey, Apple Corps of Dallas, the Alamo PC Organization, the Philadelphia Area Computer Society, and the Boston Computer Society. Good work, folks. ■

I love happy endings. Individual readers (not vendors) should send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or Connect (Branscum). Conversely, drop me a line if a company is ignoring you. I will help solve your problem, if I can. If your user group is sponsoring an event, please get in touch.

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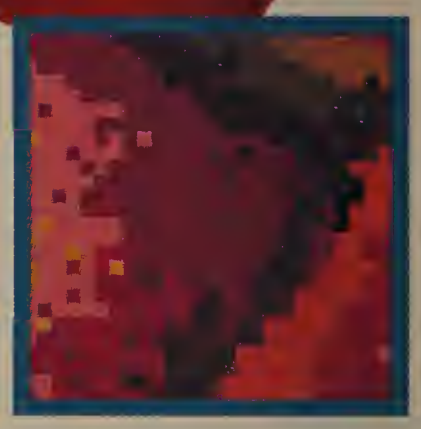

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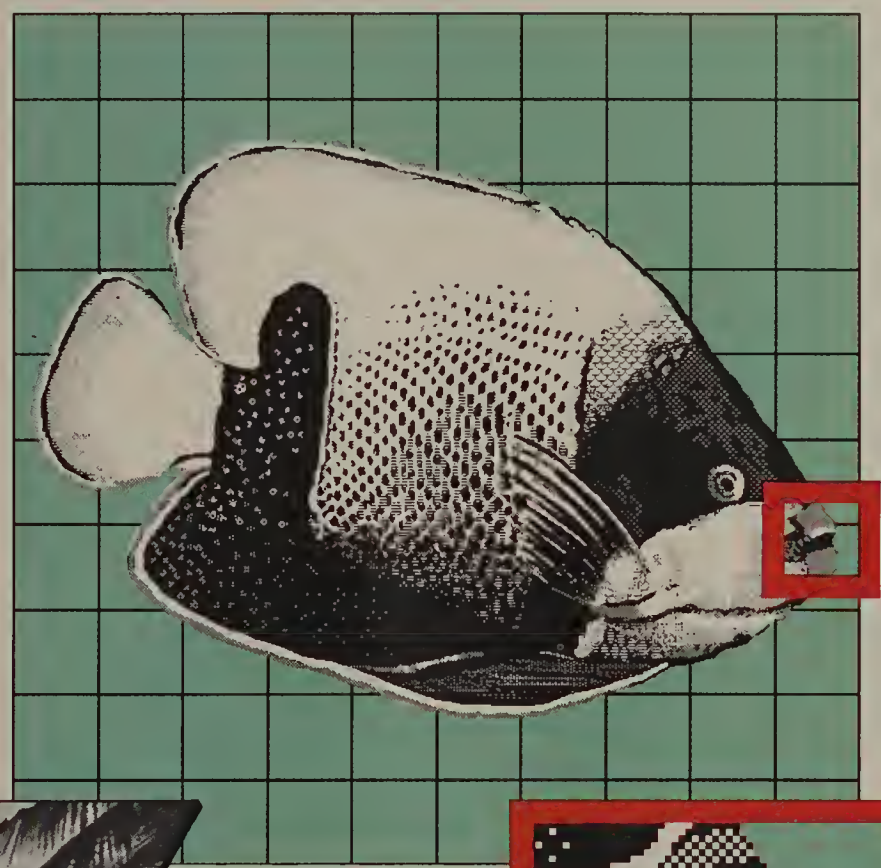

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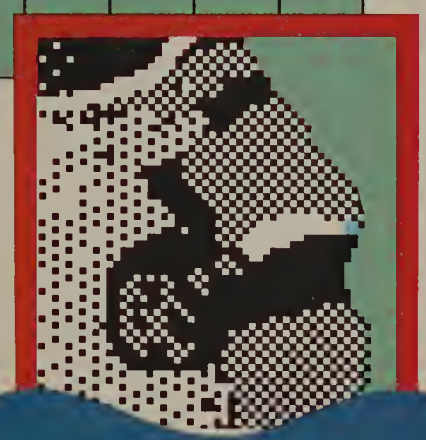

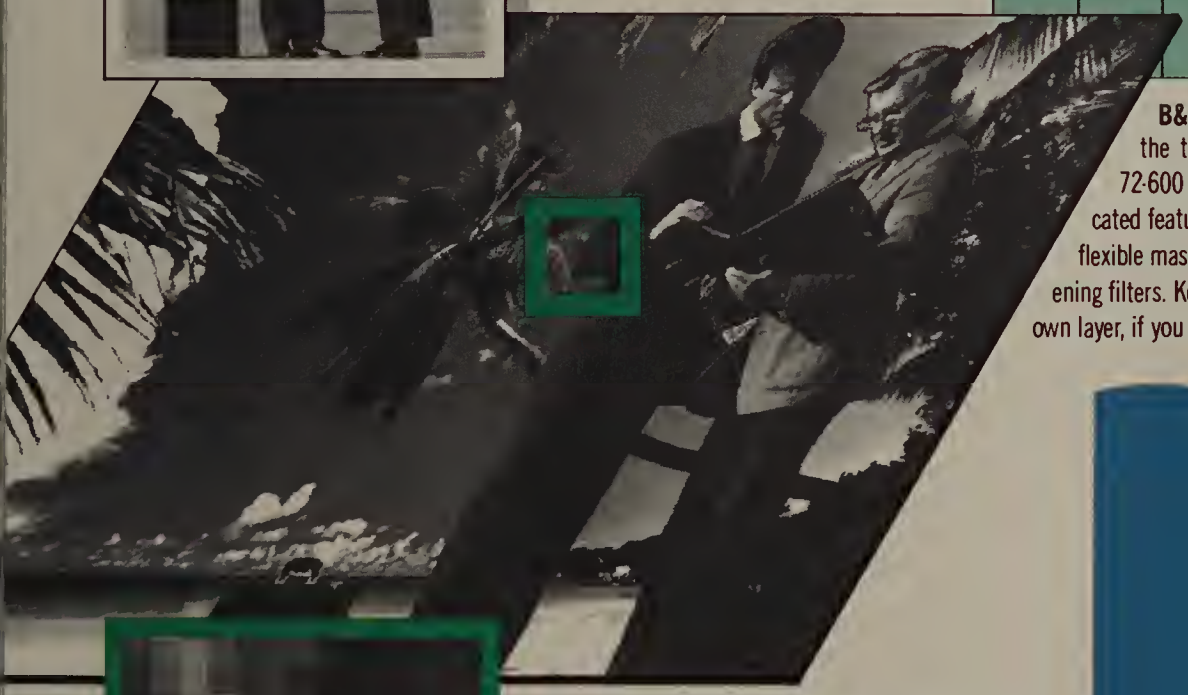

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Mac II Forever?

Coping with the System 7.0 changeover

by Thom Hogan

The System 7.0 changeover is almost upon us. The changes in the new operating system will impact every Macintosh user. The compelling reason to change your system will come by the end of 1990, when most new software will begin taking advantage of the additional features of System 7.0. Last month I described the options classic Mac owners have for upgrading their machines in preparation for the change. This month I'll tackle what to do if you've got a Mac II.

ORIGINAL MAC II OWNERS

Those of us with the original Mac II (68020 processor, 800K drive, and so forth) are probably in worse shape than other Macintosh users. We bought our machine as state-of-the-art equipment and now find it's an also-ran compared to the IIcx and SE/30. Worse still, the Mac II was underengineered. The air flow in the case is terrible, the fan is noisy, you have to remove the disk drives to add RAM, you can't add an external floppy—the list of complaints runs on and on. Now, with the System 7.0 announcement, we find that we've got some new disadvantages to deal with. No one ever said a pioneer's life is easy.

First, let's deal with virtual memory. Virtual memory lets your machine act as if it had more memory than it does. With an adequately large hard disk, System 7.0 will allow you to configure your system as if it had 32MB or more of main memory. Want to run ten programs simultaneously under MultiFinder? That's not a problem with virtual memory. Moreover, System 7.0 lets you easily specify larger memory sizes than the current 8MB limit (see my description of Connectix Virtual and memory in the June issue).

Fine. But to get that feature you'll have to add a 68851 PMMU (paged memory management unit) to your Mac II. Here's where things get sticky. First, as I write this, all of the Motorola PMMU chips I've seen still have an *X* immediately after the number. That stands for experimental; it means that Motorola is not yet able to make the chips in production quantities. Thus, these chips are hard to find. So, if your local Apple dealer happens to have one of these $595 goodies in stock, you just might want to consider buying it.

Then again, maybe not. The problem is that the 68851 is not necessarily compatible with other options you may want to add to your machine. Any 68030-based accelerator will require you to unplug the 68851. One example is the Orchid Sprint II board I've been using in my machine during the last few months (the best $300 speedup choice available, by the way). The Sprint II is incompatible with many other options I might want to add—such as the SiClone accelerator and the DayStar Digital accelerator—because all these products fit into the 68030 socket, and there's only room for one. This is not really Orchid's fault but a result of how complex it is to build functional products that tie directly into the Mac II's hardware (as opposed to running through NuBus, which imposes some performance limitations).

The potential for incompatibilities boils down to three areas: (1) most of the CPU options affect things like RAM fetch cycles; thus, if you install two of them there's an interaction that must be dealt with; (2) some of the options use the same socket or are physically incompatible (you can't add an Orchid Sprint II and a Dove MaraThon 030 at the same time because there's no room, among other reasons); and (3) System 7.0 is not yet available, and so there may be further incompatibilities when it finally arrives.

I'd really like to recommend three accelerators to Mac II users: for low-cost modest performance improvement (20 percent), get an Orchid Sprint II; for modest cost but better performance (30 to 50 percent), get a Dove MaraThon 030; for high cost but unequaled performance, buy the SiClone 030. Unfortunately, it is possible that all three of these products will have to undergo some (let's hope minor) modifications to be completely compatible with System 7.0. You can buy now and gamble that there will be no

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Circle 486 on reader service card

problems making the switch to 7.0, but you may be wrong.

This kind of uncertainty makes it difficult to justify spending big bucks now when six months from now you'll be able to make a secure, intelligent decision. (Actually, the transition to 7.0 could be a death blow to some Mac II peripheral makers as consumers wait out the change.) If you're the conservative type and have the bucks (more than $2000), about the only upgrade option you should consider for a standard Mac II is an upgrade to a IIx, courtesy of your Apple dealer. If you've already bought one of the hardware extenders or accelerators mentioned (as I have), keep your fingers crossed and pray for compatibility.

MACINTOSH IIX/IICX

If you've got a Mac IIx or IIcx, you're sitting in the best position of anyone to take advantage of System 7.0 when it first appears. That's assuming that you've taken care of a few other minor things, however.

For example, how's your hard disk doing? Did you buy an 80MB disk and fill it to capacity the first week? Well, if you did, think about either removing unnecessary files or buying a bigger drive. The reason? You'll want free space on your hard disk to dedicate to virtual memory. For modest users, that may only be 8MB. For those of you working with sophisticated 32-bit color graphics, that may be 32MB. And since the performance of virtual memory swapping will be constrained by the speed of your hard disk, you might want to consider buying one with a track-to-track access time of less than 20ms, or a built-in disk cache (like the Quantum drives).

Personally, I've added a removable-media external hard disk to my system, and I've minimized what I put on the internal hard disk. The 45MB removable cartridges on my external Mass Micro drive allow me to have data sets for writing, programming, testing, and all the other work I do. If I want to work on graphics, I plug in my graphics cartridge (which has all my graphic applications and data on it). Meanwhile, the internal hard disk has the system software, the virtual memory spool file, most of my utilities, and a few standard applications.

If you are considering upgrading, among the things to think about are SIMMs. If you've got any 256K SIMMs in your machine, you're not driving a state-of-the-art machine. With System 7.0, you can use 4MB SIMMs to address up to 32MB on the system board. These days I don't recommend adding any memory to a Mac II unless you buy 1MB SIMMs. Unfortunately, you have to do that four SIMMs at a time, which can gobble up a healthy chunk of change.

Why add SIMMs? Well, System 7.0 will absolutely require 2MB of memory to run even the most minimal application. That's the maximum memory you can add using 256K SIMMs in a Mac II. I recommend a minimum of 4MB of RAM once you start using System 7.0. That should give you satisfactory performance when swapping

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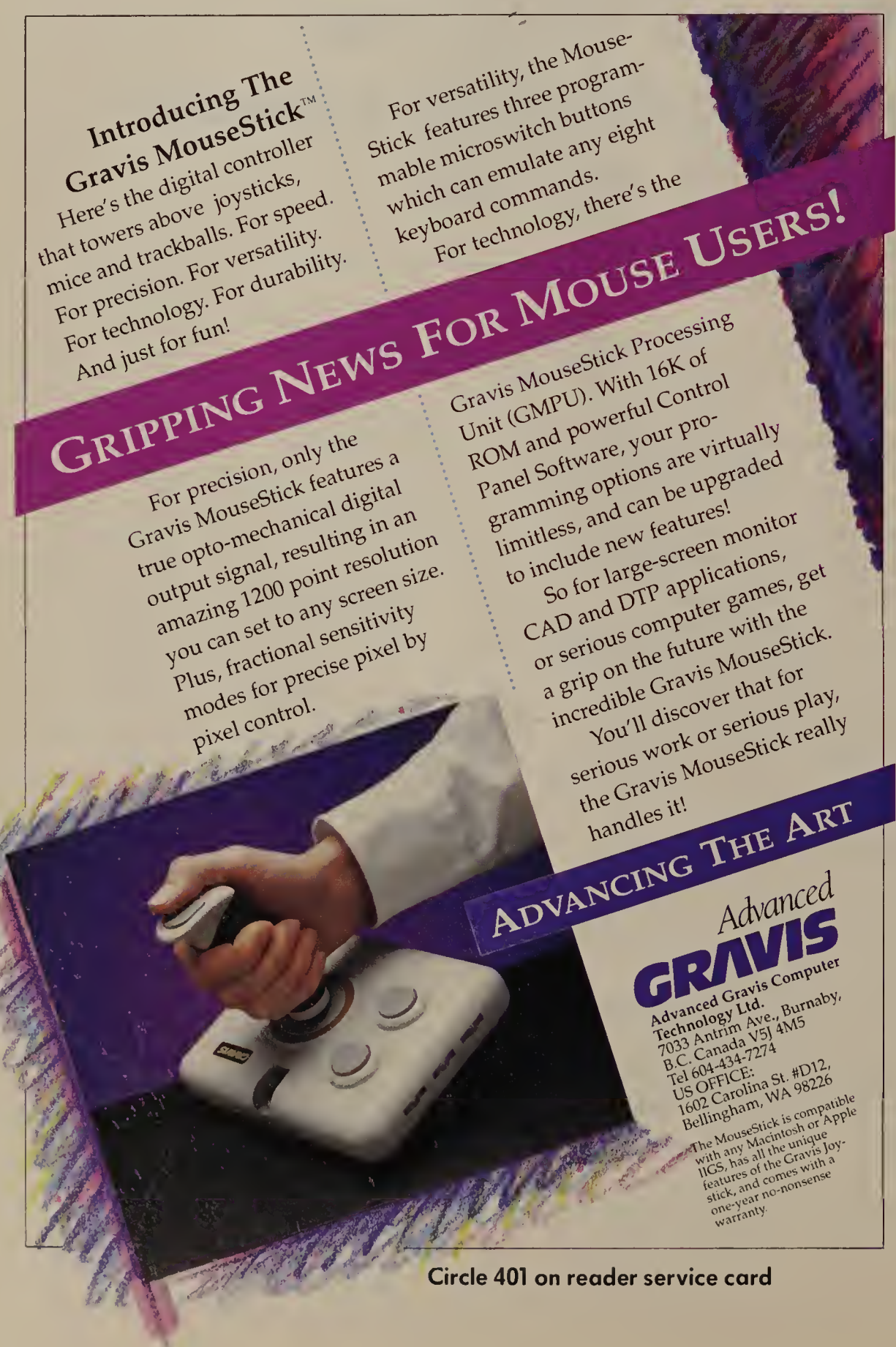

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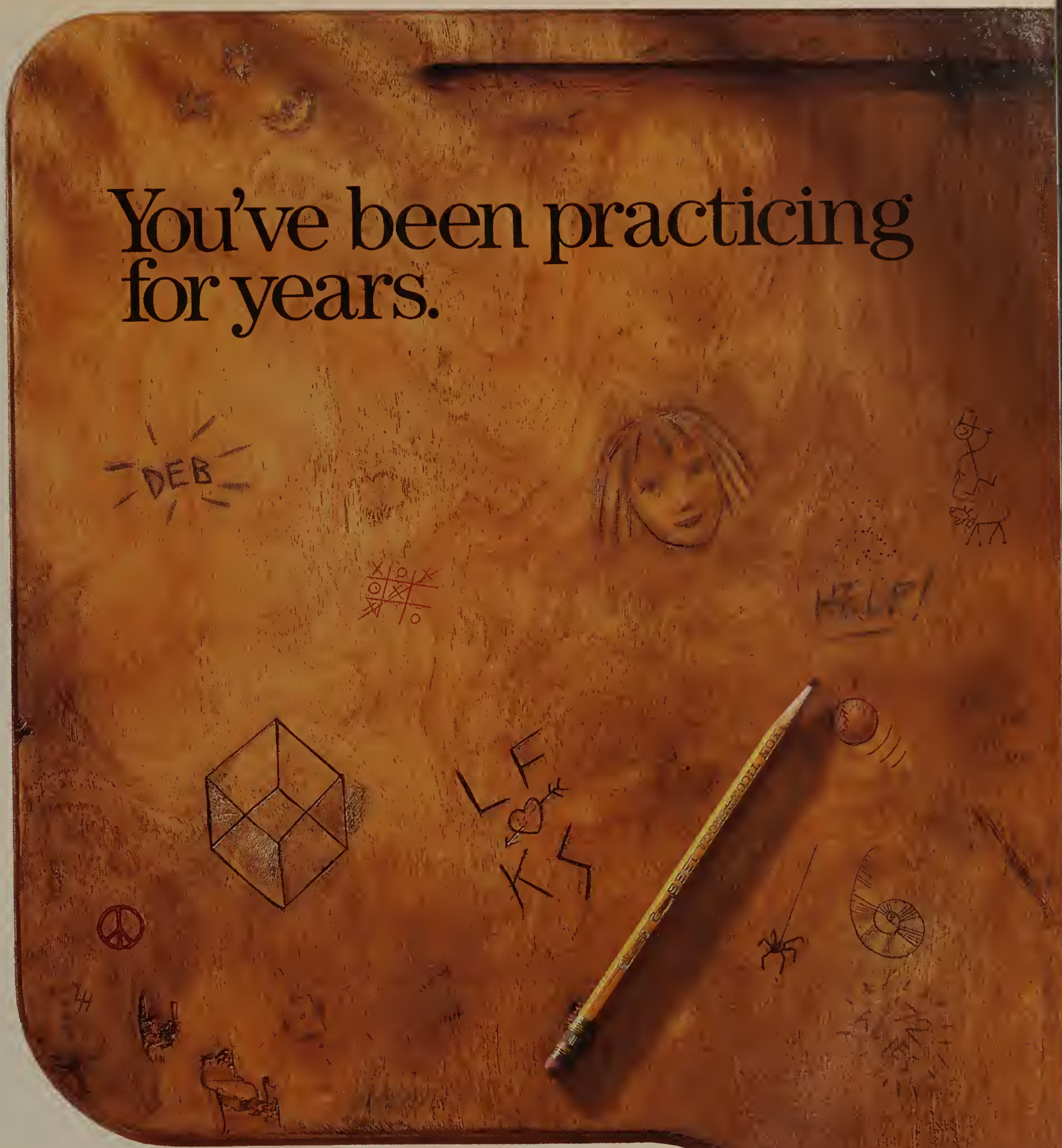

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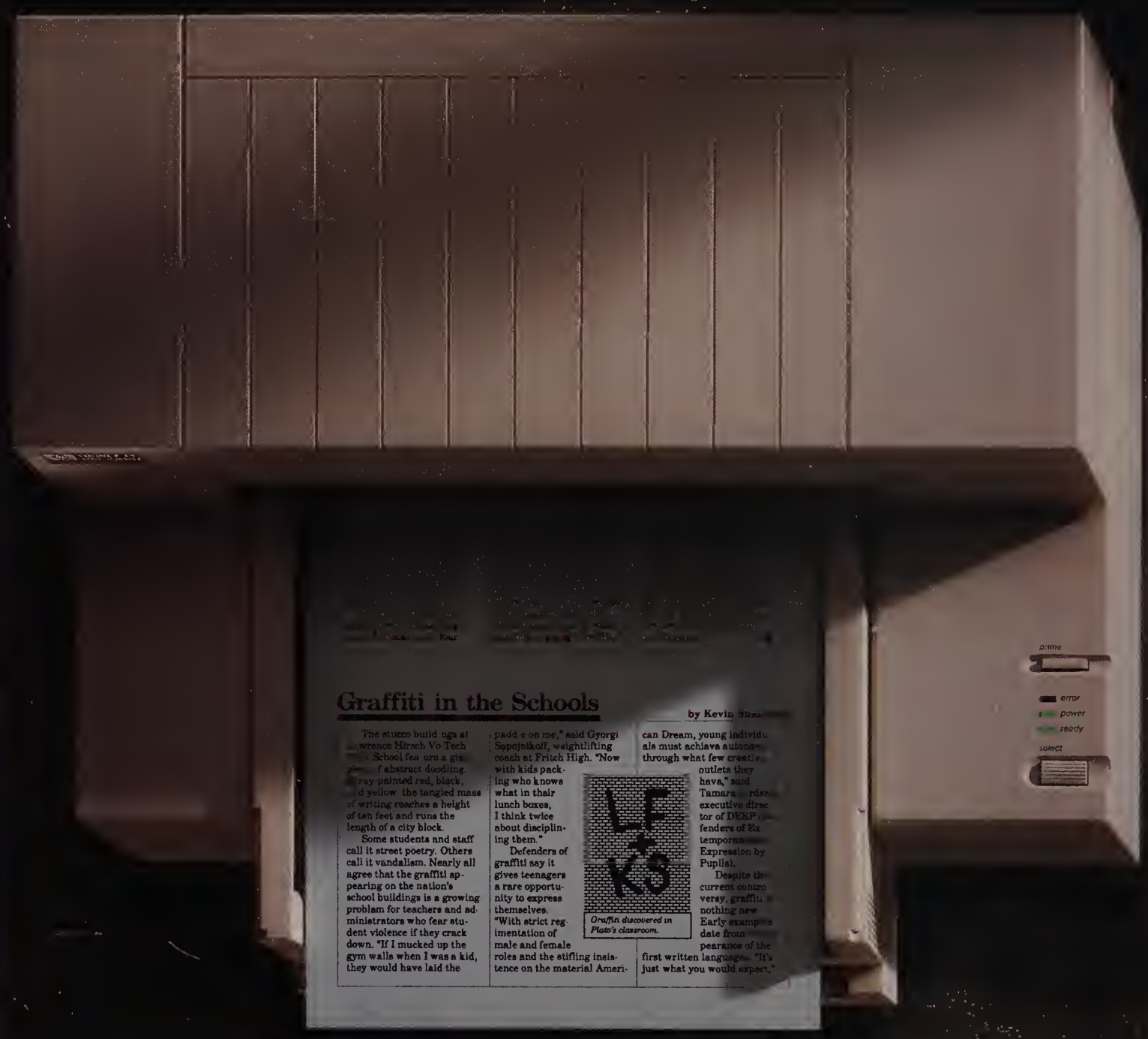

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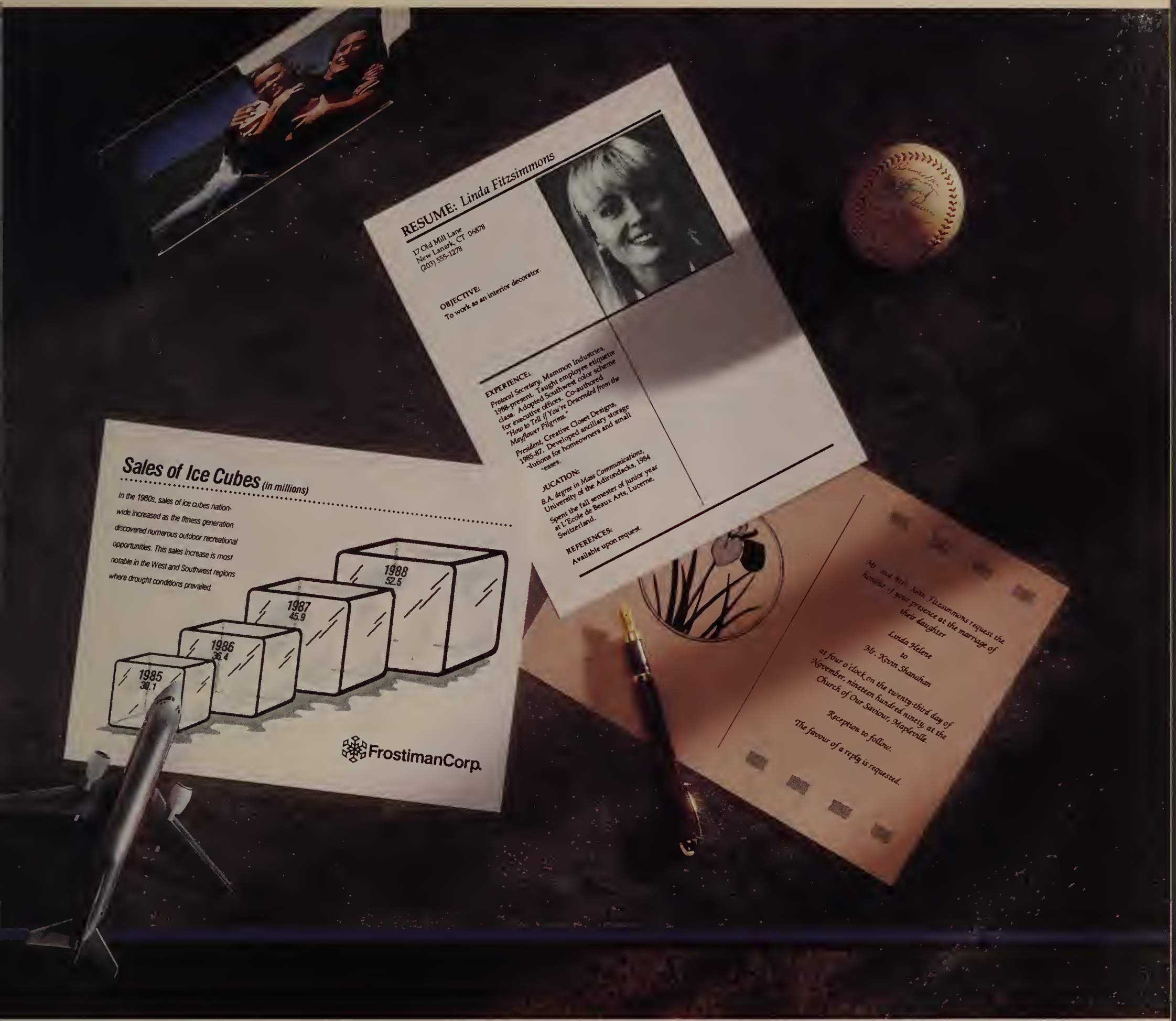

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between applications under MultiFinder, even with a 16MB virtual memory partition on your hard disk. It's clear from my experience with Connectix Virtual that a 2MB Mac swapping to an 8MB virtual file on disk is noticeably slower than a 4MB machine doing the same thing.

If you're satisfied with what you have, great; just sit back and wait for Apple to send out the final disks for System 7.0. If not, save your pennies for an upgrade.

WHY CHANGE AT ALL?

Apple believes that the change to System 7.0 will be every bit as dramatic as the change to HFS and 800K drives when the Plus was introduced. I think the change is going to be even more dramatic. Simply stated, software developers see things in System 7.0 that they definitely want to add to their programs (and will). Those changes will draw a dividing line between users who have System 6.0 and users with 7.0. I'm sure developers will support 6.0 users as long as possible, but the future of software products will force them to embrace 7.0. By 1991, I suspect, you'll see nifty new products that run only under System 7.0. Since even a 2MB Plus owner will be able to take advantage of many of System 7.0's features, Macintosh developers don't feel the changeover will be as painful as, say, the changeover from DOS to Presentation Manager will be in the IBM PC world.

From the user's standpoint the choice is easy as well. For the cost of 1MB of extra memory, all Mac owners will get better font control; closer mapping of what's on the screen to what you get on the printer; better Clipboard support and easier moving of data between applications; better network support, including remote database access and E-mail; a wider range of printer choices; and an easier-to-use Finder. All of these features may not appeal to all Macintosh owners, but I bet that at least one of them does. Actually, the new Finder alone appears to be worth the switch (no more Font/DA Mover or fixed menus and views). And if you own a Mac II, IIx, IIcx, or SE/30, System 7.0 gives you access to 32-bit color, 32-bit memory addressing, and virtual memory.

System 7.0 is going to breathe additional life into the Macintosh family. Yes, it is expensive to make some of the changes and upgrades. Yes, there will be a hassle with some preexisting hardware that suddenly needs an upgrade of its own. Yes, some software products will be left behind. And yes, Apple is hurting many of the smaller utility developers by incorporating new features into the Finder.

No change comes without a little pain. Just remember that change always brings with it opportunity. I predict that once we've all completed the switch to System 7.0 we'll find ourselves more productive and happier. ■

Thom Hogan is president of Macreations, a Macintosh software developer, and publisher of The Macintosh II Report. *His reference book,* Programmer's Macintosh Sourcebook *was recently published by Microsoft Press.*

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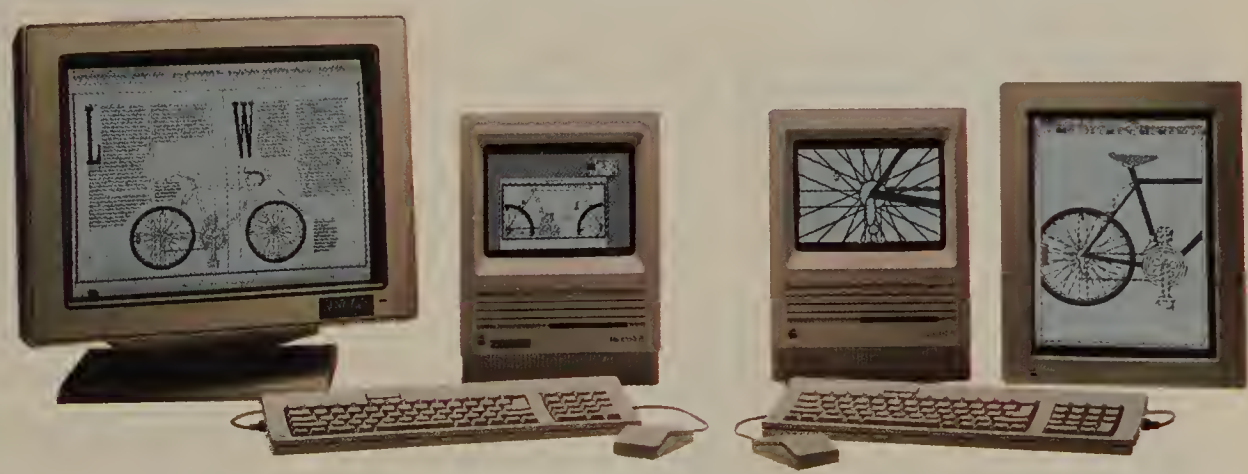

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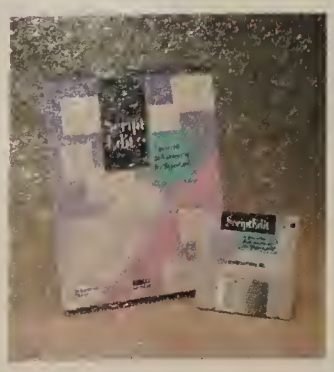

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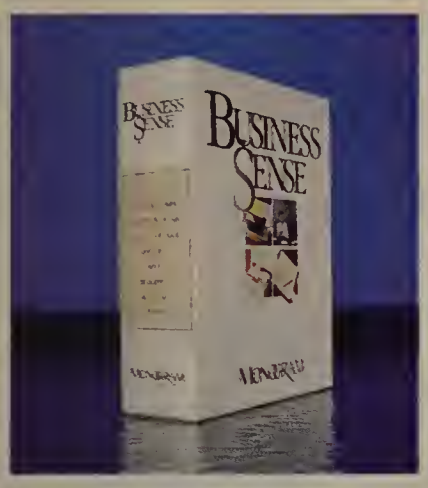

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Where in Europe is Carmen SanDiego? ..... 30.
Where in the USA is Carmen SanDiego? 30.
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PreSchool Disk 2 ..... ***Special*** 28.
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Lynx Computer
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MousePad 9" x 11" Size ..... 9.
Moustrak Pad L/F 9" x 11" ..... 10.

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Kensington
Mouseway *(Mousepad)* ..... 8.
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Apple Security Kit ..... 34.
Antiglare Polarizing Filter ..... 33.
Mac II Stand and Cable Kit ..... 65.
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ImageWriter LQ Black ..... 17.
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Digital Vision
Computer Eyes Mac ..... 209.
Computer Eyes Mac II ..... 349.
Koala Technologies Corp.
MacVision 2.0 *(Digitizer)* ..... 219.
Mac Director ..... 109.
Kurta
IS ADB Tablet 8½x11 ..... 255.
IS ADB Tablet 12x12 ..... 385.
IS ADB Tablet 12x17 ..... 625.
Cordless 4 Button Cursor ..... 65.
LogiTech
ScanMan ..... 349.
Seikosha
SP1000 *(Imagewriter comp.)* ..... 235.
Summagraphics
Bit Pad Plus ..... 325.
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Big Thesaurus ..... 59.
Spelling Coach 3.0 Professional ..... 115.
Electronic Arts
Thunder! II ..... 52.
Lundeen & Associates
WorksPlus Spell ..... 46.
Microlytics, Inc.
Word Finder *(Synonym Finder)* ..... 36.
Electronic Word Finder ..... 59.
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A.S.D.
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Fileguard II ..... ***Special*** 129.
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Circle 44 on reader service card

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February 1989

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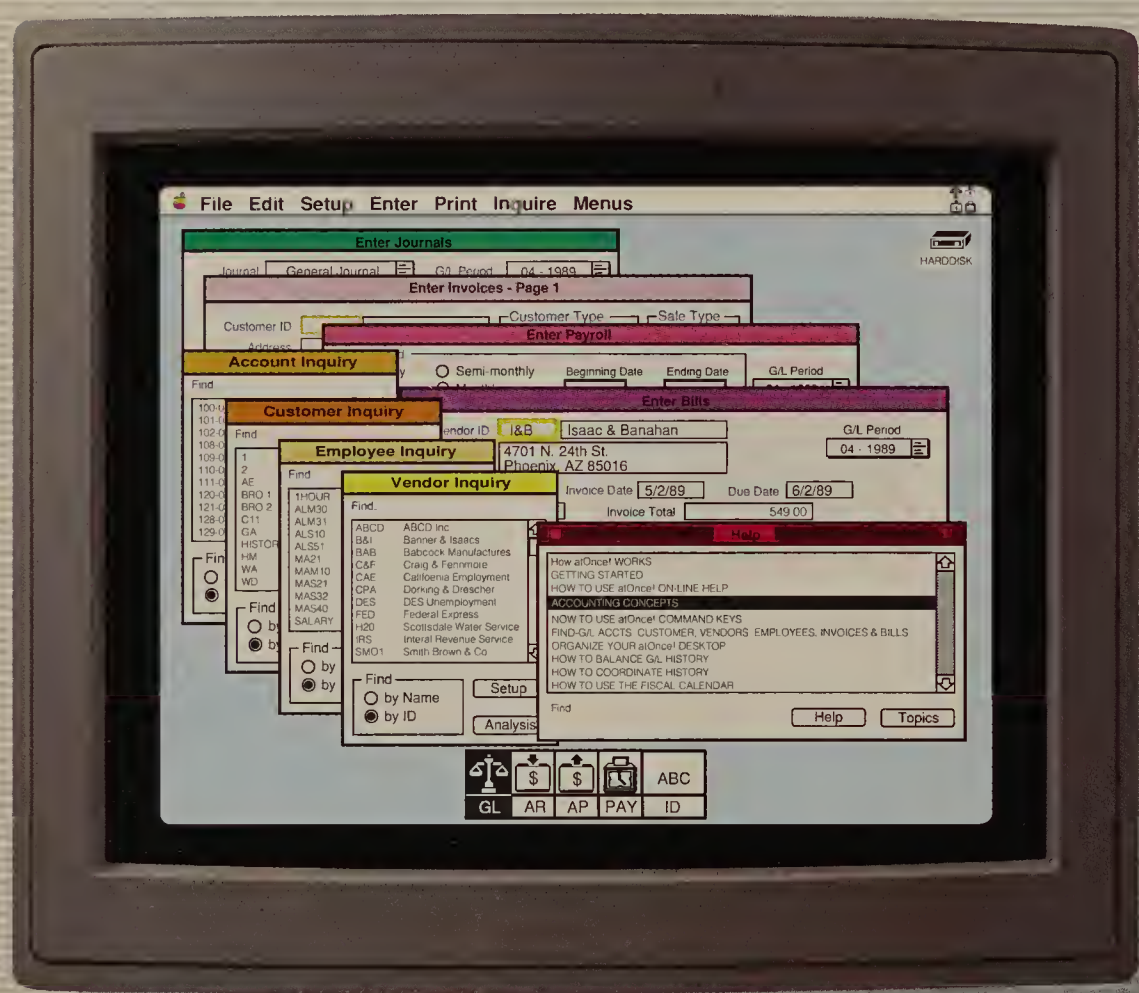

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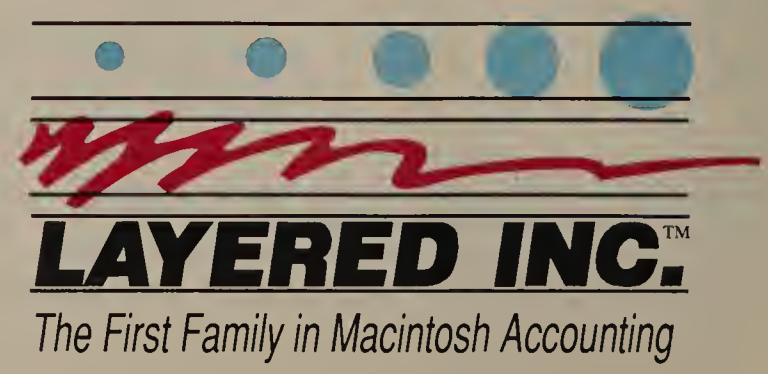

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Circle 128 on reader service card

Verbatim

An interview with

GCC Technologies founder

Kevin Curran

Kevin Curran is one of the three founders of GCC Technologies, the first company to provide add-on hardware for the Macintosh. Kevin grew up on Long Island, in New York, and attended MIT. General Computer, GCC's predecessor, was started in March 1981 by Curran and Doug Macrae. They were joined shortly thereafter by John Tylko (chief operating officer). The company name was changed in 1987.

MW *How did you and Doug decide to start a company?*

CURRAN At 16 I had worked at a small electronics company and had already made up my mind that this was what I wanted to do. Doug, John, and I all lived off campus while at MIT, in the same house on Beacon Street. We started in video games by accident, with a game in our own dorm. One night we decided that the profitability was going out of operating video games and we decided it would be better to leverage our skills as engineers and design games.

We wrote and rewrote new software for coin-operated video games in the form of ROM add-on boards. Our first game was an Atari Missile Command rewrite, called Super Missile Attack. We added new bells and whistles, and sold it to the owners of the game. We basically did our first product in nine days during spring break.

PHOTOGRAPHS BY UNC CORNELL

MW *What kind of a market was there for these games?*

CURRAN We sold over 1000 kits. We also did Ms. PacMan, which we licensed to Bally. It sold over 100,000 games. In 1982 we formed a partnership with Warner/Atari and developed over 50 products for them. We did Ms. PacMan, Centipede, Pole Position, Dig-Dug, and others for various game systems. Some were originals, some were games we converted to other machines.

MW *Why did you leave that market?*

CURRAN The video game business went into a steep decline in 1983. After the Mac came out in January of 1984, we decided to develop products for the Mac.

MW *How did you decide what product to make for the Mac?*

CURRAN We looked at three software products and decided not to introduce them when we saw the dollars that Lotus was spending on the Jazz debut. We felt we couldn't compete, so we dropped our software initiative.

The early 128K Mac was so slow that it was useless as a software-development tool. The HyperDrive [an internal hard drive] was developed basically as an aid for in-house software development on the Mac. In September of 1984 we decided that the HyperDrive could be sold on the open market, and we arranged a meeting with Steve Jobs. Steve decided that Apple would not license the product but would provide benign support, and so we became a reluctant peripheral vendor.

MW *When was HyperDrive introduced.*

CURRAN At Comdex in November of 1984. We sold the first product in January of 1985. The reception was exceedingly positive. The original Mac so much needed it that the response was overwhelming.

MW *How many were sold?*

CURRAN Over 30,000 at an average price of $1600 for the 10MB and 20MB drives. When we started to sell HyperDrives, their installation voided the Apple warranty. The early drives had to be soldered to the Macintosh controller board in place of the 68000. In May of 1985 we introduced a version in which a controller board was attached to the 68000 by a clip. Apple then decided that installing a HyperDrive would not void the warranty. The last product was sold in December of 1986. Apple's addition of the SCSI port to the Mac Plus changed the disk market completely.

MW *GCC also introduced a file server, the HyperNet. What happened to that?*

CURRAN There was no problem with the reliability or quality; we just decided not to push the product when Apple announced AppleShare. We support standards. For

(continues)

example, the SCSI port is in some ways the best thing that happened to us. We've designed and sold many drives and printers for the SCSI port on the Mac.

MW *There is a perception that GCC received less than fair treatment from Apple.*
CURRAN I think that companies such as GCC have an interesting relationship with Apple. I feel Apple has a split personality in relationship to companies such as GCC. Some people in Apple are—and were—supportive of GCC Technologies. They understand the contribution we make to the market. Others in Apple view us as competition.

For example, if you were the printer product manager in Apple, you would be concerned with our Personal Laser Printer (PLP) when you introduced the LaserWriter SC. On the other hand, we've had a remarkably good relationship with some Apple staff over the years, such as Ed Colby. One shouldn't think of Apple as a monolith that acts with one mind. The situation with Apple is, in some regards, what developers make of it.

MW *There was one very bad period when HyperDrives were crashing a lot.*
CURRAN Yes. In retrospect, we would never do the HyperDrive as a product today. We made several mistakes. These mistakes were compounded by the tremendous growth of the demand for the product. We assumed that the dealer could install HyperDrives, but it was not an easy procedure. It was vexing for us to have problems where products were not installed properly. We lived up to the responsibility of cleaning up all the HyperDrive problems that were brought to our attention. I think we overcame those problems and came back stronger for it.

A big part of the learning experience was realizing that vendors who sell subassemblies to us basically lie about certain things. Their products often don't work as claimed or as specified. Adherence to temperature specifications was an especially big problem area. We hired several engineers out of IBM and General Motors who had a great deal of experience in qualifying subassemblies and in setting up a high-quality manufacturing process. That work has paid off since then. The FX20, our first external product, is still a hot seller. It was developed under new post-HyperDrive rules and introduced in August 1986. GCC is now making another change of direction by going from dealer-only sales to direct sales for users, much like Jasmine. The latter, meanwhile, has announced the addition of dealer sales.

MW *What's happening?*
CURRAN We're not changing from dealer sales, but adding to that channel. We see direct sales as supportive to what we do with dealers. We believe that there is a channel in direct sales and a channel for dealer sales. It is up to the users.

MW *How big is GCC?*
CURRAN We have 115 employees, with

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about $30 million in revenues.

MW *What does GCC currently sell?*
CURRAN Innovative peripherals with high software content. About 60 percent of our sales are printers, notably the PLP line, which features our proprietary software for rasterizing output of Mac software.

MW *One question about the PLP has been the speed of the output and having to tie up the computer to process the page.*
CURRAN The PLP is faster than the LaserWriter in some applications, and in some applications slower. It's a pretty reasonable trade-off given the cost savings, and our PLP can be made both PostScript and network compatible through upgrades.

MW *When drive owners have problems, what should they do?*
CURRAN It depends upon the purchase. If you bought it from a dealer, return it to the dealer, but in some ways that's unsatisfactory because you lose your data. People should always back up their data—if you lose your data, that's probably more than the value of your drive. Always ask vendors if they can help, because they know their products best. Sometimes we've recovered lost data for customers.

MW *What are the major things likely to go wrong with hard drives?*
CURRAN I don't think there is any one major problem. Failures fall into several categories. One problem is no spin—on power-up the drive doesn't spin up, due to a bad motor or to *sticktion* (the head adheres to the surface of the disk and the motor doesn't have enough torque to break away the read head from the surface of the disk). Another problem is unusually high error rates due to various causes, in which data is corrupted.

MW *Where do you think disk drive technology is going?*
CURRAN To faster, higher capacity, and lower-cost products.

MW *How has drive technology gone from $1600 per 10MB in the original HyperDrive to today's prices?*
CURRAN Drive mechanisms are now less expensive. They include the disks (or platters on which the data is stored), the head assemblies (that read data from the platter), the stepper motors, and the controller board. Quality and performance have increased, and costs have decreased since we entered the business in 1984. When [the COO of Seagate Technology] started in the business, 5000 hours mean time between failures for a drive was acceptable for a manufacturer like DEC. Today's manufacturers want 50,000 hours or better. Drive manufacturers are decreasing their prices, and as our volume increases we also bring prices down. That's true for all peripheral manufacturers.

MW *The drive industry is one of the most litigious areas of the computer industry. Why?*
(continues)

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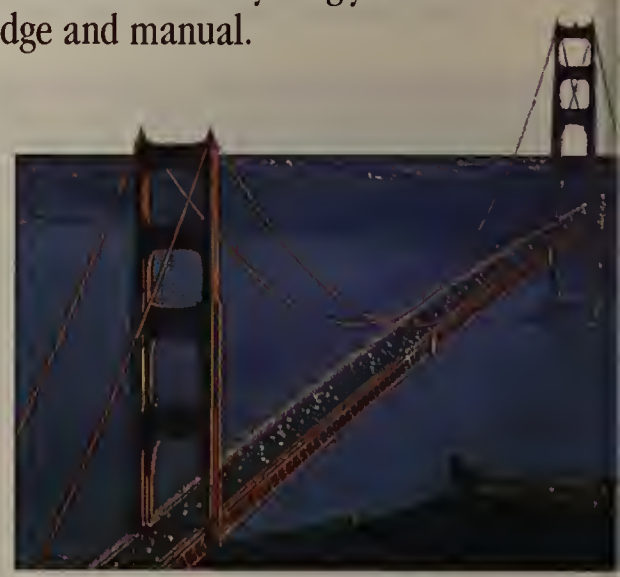
MaxStream works with the Mac Plus, SE, II and IIx®. It plugs into the standard SCSI port, and comes with everything you need – cables, software, DC600 cartridge and manual.



Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

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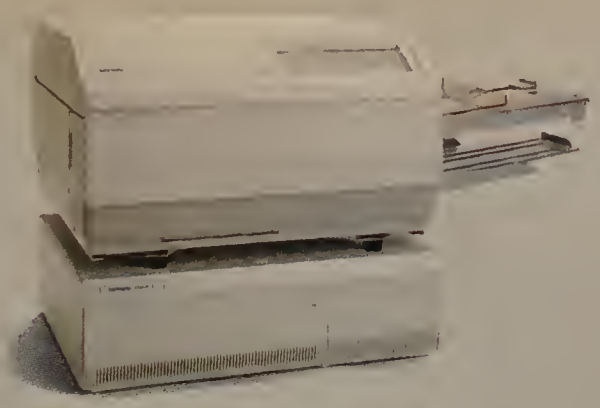

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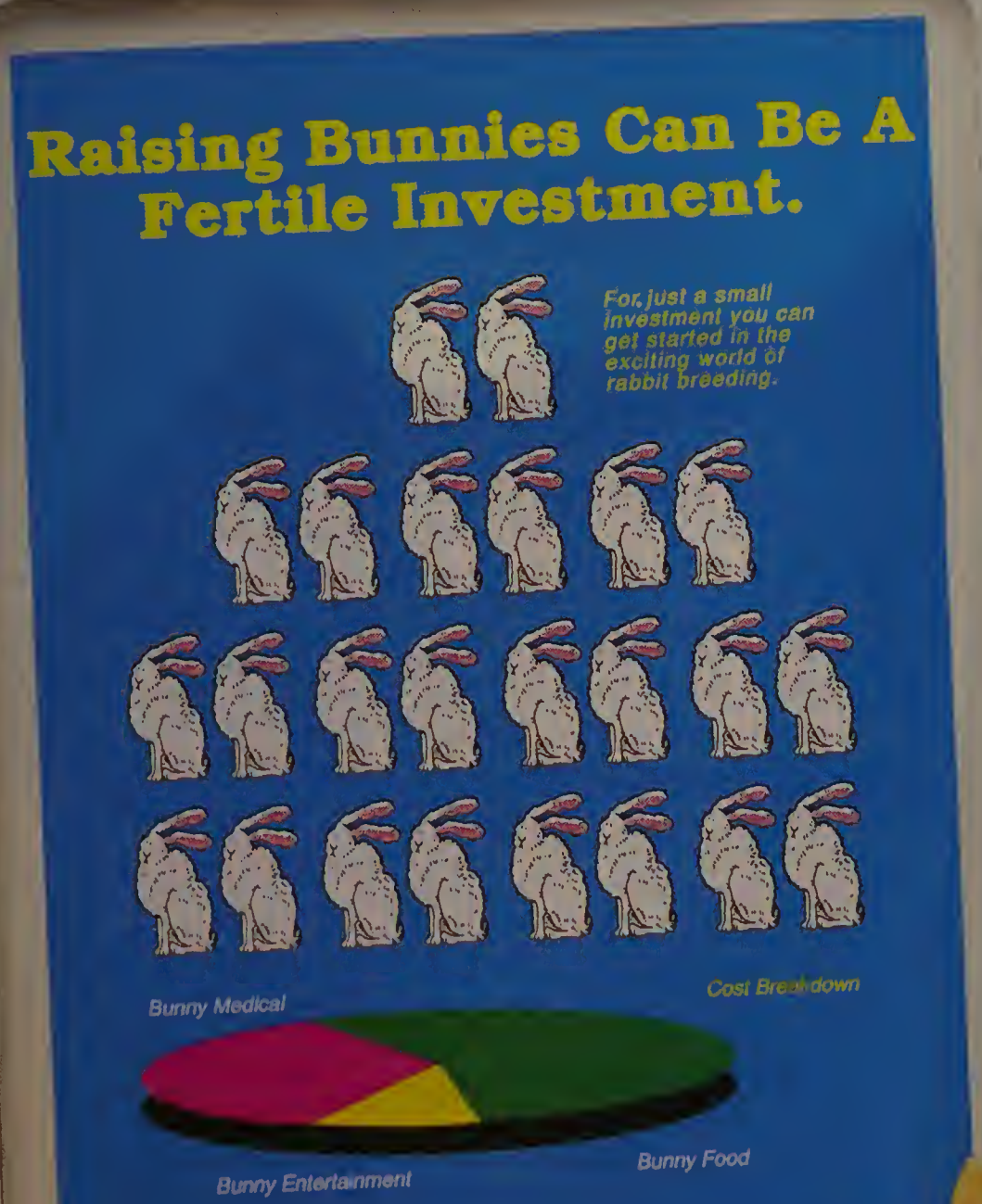

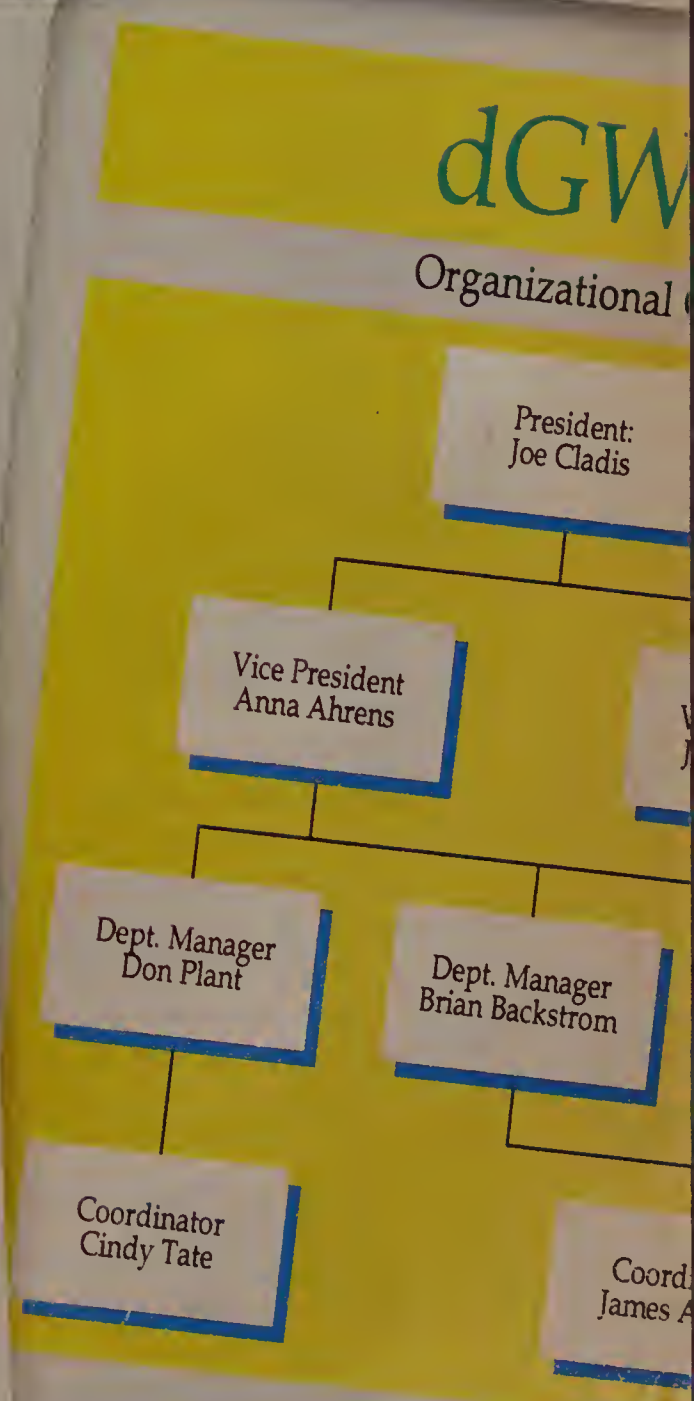

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CURRAN I think that just reflects the litigious nature of American society. The manufacturing of disk drives is very capital intensive and competitive. The advantages for manufacturers are few and far between. Many manufacturers fight vociferously to defend any proprietary advantage they have. We now also see the entry of Japanese companies such as Sony into the Winchester drive market. Sony's design win at Apple [Apple buys Sony 40MB hard drives for the Mac II line] is a significant event. It's the first significant win by a Japanese manufacturer in the U.S. personal computer market. But Quantum, which lost that contract, turned around and sued Sony for unfair competitive practices.

MW *Why hasn't Japan competed in the hard drive market?*

CURRAN That's interesting. The technology has primarily been developed in the U.S. Until recently, the number of units of a standard design sold had not reached a point where the process of manufacture lent itself to mass production, at which the Japanese excel. Also, the erosion of the dollar versus the yen, or the appreciation of the yen, has slowed their entry, made it more difficult for Japanese companies to sell in the U.S. where they have no capital investments.

In 1986 there were several Japanese drive start-up efforts and the companies closed when they decided that they had no competitive advantage. Oki Electric, for example, in Takasaki, Japan, has a huge facility, part of which was dedicated to the manufacture of disk drives. Oki tried to get into the business, but they've pretty much dropped their efforts. They simply couldn't compete on price in the disk drive market. This is changing as certain Japanese manufacturers have adjusted to the problems of the strong yen.

MW *What is the best hardware, not including GCC products?*

CURRAN Today, the Mac IIcx. The IIcx is going to take the Mac further into business in corporate America than the Mac has ever gone before. It's the most Macintosh-like Mac introduced to date. In terms of hardware, there is a lot of neat stuff, any number of fine products in the market. I tend to like certain clean niche products, like the Shiva NetModem.

MW *What about the worst products?*

CURRAN Our worst product was the HyperDrive 20. We had reliability problems that caused no end of grief for the company, and we are still dealing with customers who have problems with the product. We have an upgrade policy to swap people to a GCC SCSI drive. The networkable PLP was our worst product from the cost-of-engineering point of view. It fulfilled a need no one felt. It turns out that when people want to put a printer on the network, they want a full PostScript printer, so they buy our Business Laser Printer.

Apple isn't a monolith that acts with one mind. The situation is what developers make of it.

MW *What is your opinion of Apple's warranty?*

CURRAN Ninety days is really short given the reliability of Apple products. The company could increase that to one year without any financial concessions, and in my opinion they should do so.

MW *What's the status of third-party manufacturer warranties?*

CURRAN We've just increased ours from 90 days to one year on printers, and on drives we've increased our warranty from one year to two. That reflects the reliability of our current peripherals, which are really quite solid. That's one reason most people buy our printer, due to the warranty.

MW *What effects will the font-rendering technology in system software 7.0 have on your products?*

CURRAN System 7.0 is a complete vindication of the print model we adopted, that is, QuickDraw printing. I like to think one of the things that we do well is innovation. We first looked at laser printers in 1986 and came to the conclusion that one reason laser printers are so expensive is that the user must purchase a second CPU [the CPU in the printer itself]. We wanted to have the Mac's CPU do the processing so that we could lower the price of the printer. Do the image processing on the Mac and feed the image at video rates to the laser printer. We were the first to do that on the Mac.

All of the printers we have in the field and that we sell will be 7.0 compatible. Our printer line will also have more products, products that are faster. And some other manufacturers that were unable to easily enter the market before will appear, such as Japanese printer manufacturers.

MW *What about a color laser printer?*

CURRAN We're excited about the possibility of a color laser printer. Color printers run the spectrum from toys to professional tools. Historically, we have had a hard time in arriving at what people want in a color printer; that is, what technology, for what price. Some will buy a high-end $70,000 color printer, but that's a small market.

GCC has been driven to make products we want to own ourselves. We would never aspire to own a low-quality color printer, but at the high end the market is quite small. We're studying the market carefully and want to bring out a product that we—and others—would want for ourselves. For color to proliferate, people have to have a quality printer, costing under $10,000, for a price per copy of under $1.

MW *Do you have any favorite anecdotes from GCC?*

CURRAN The best one was the time I was about to make a presentation to Bally/Midway on our software for them on Ms. PacMan. Back in 1981. There were intermission screens between the playing screens with some cartoon action. In the first one, Mr. and Ms. met. In the second, they kissed. In the fourth, they have children. We were stuck for an idea on the

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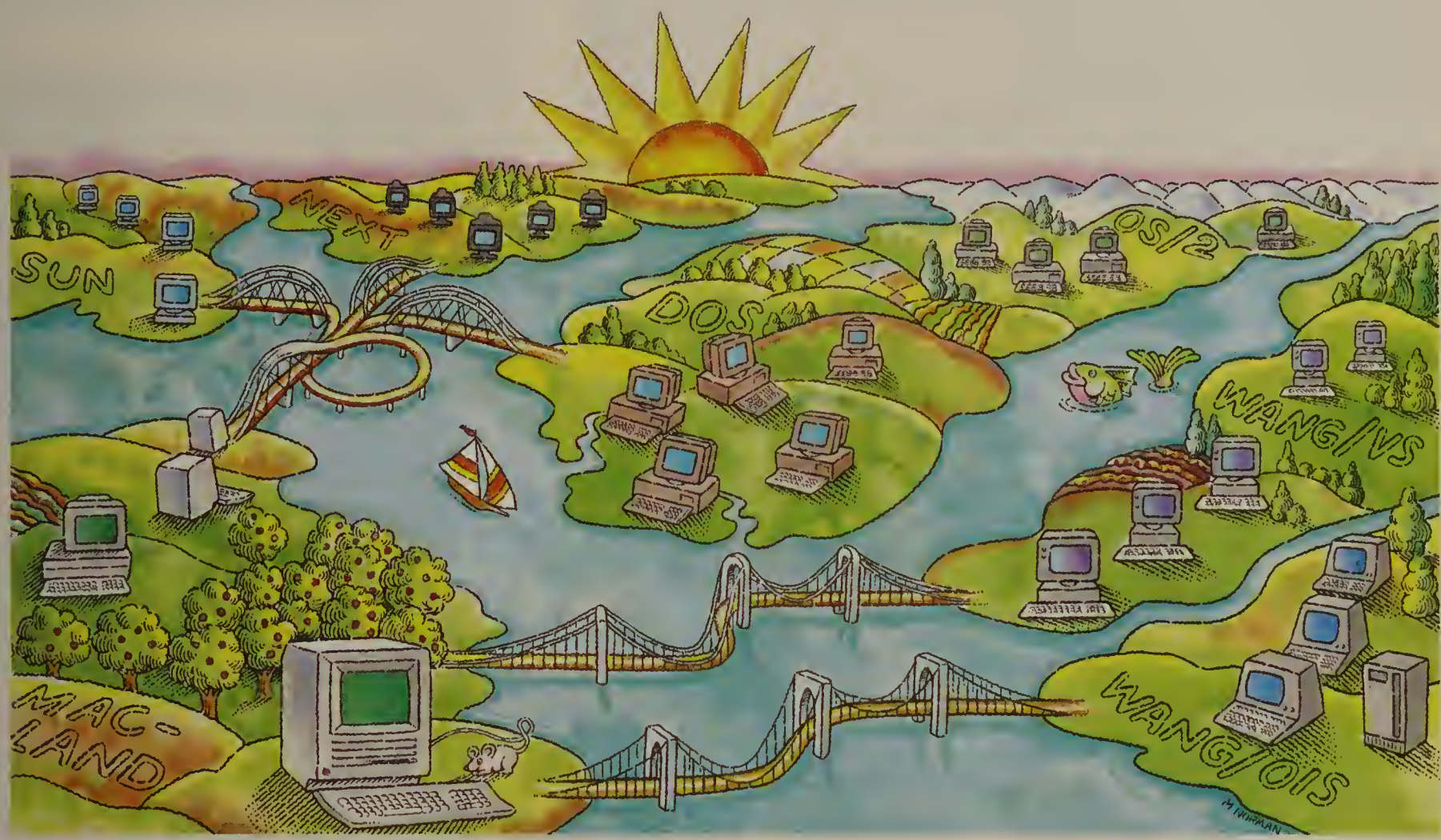

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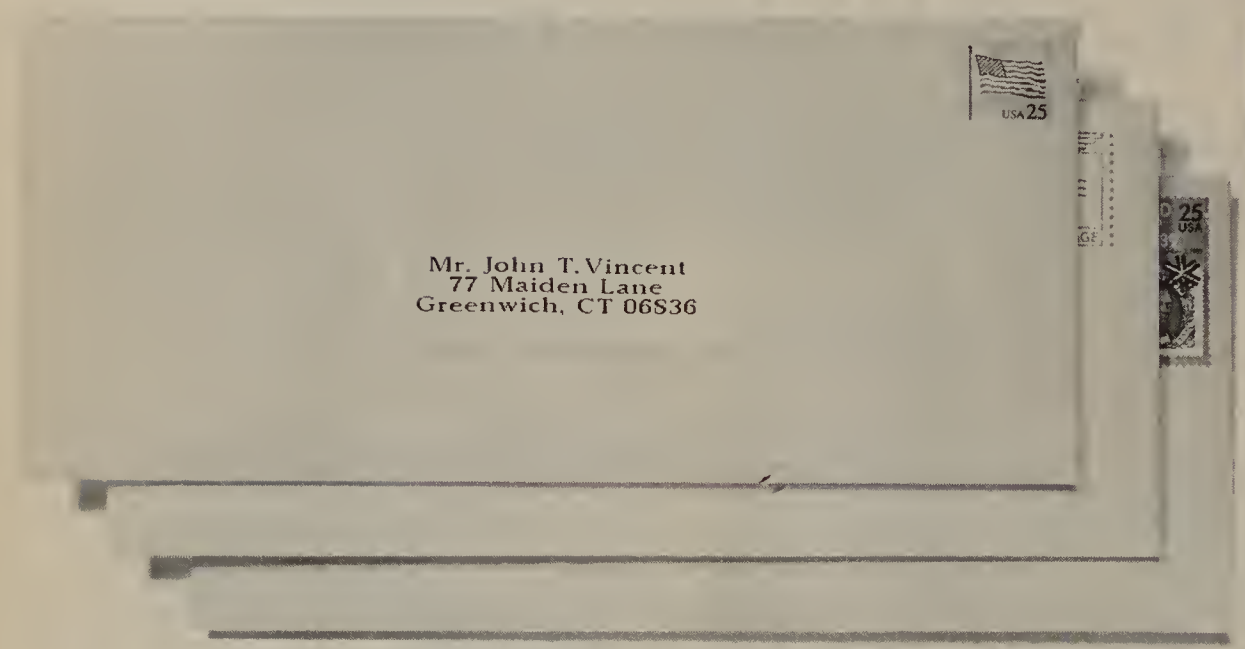
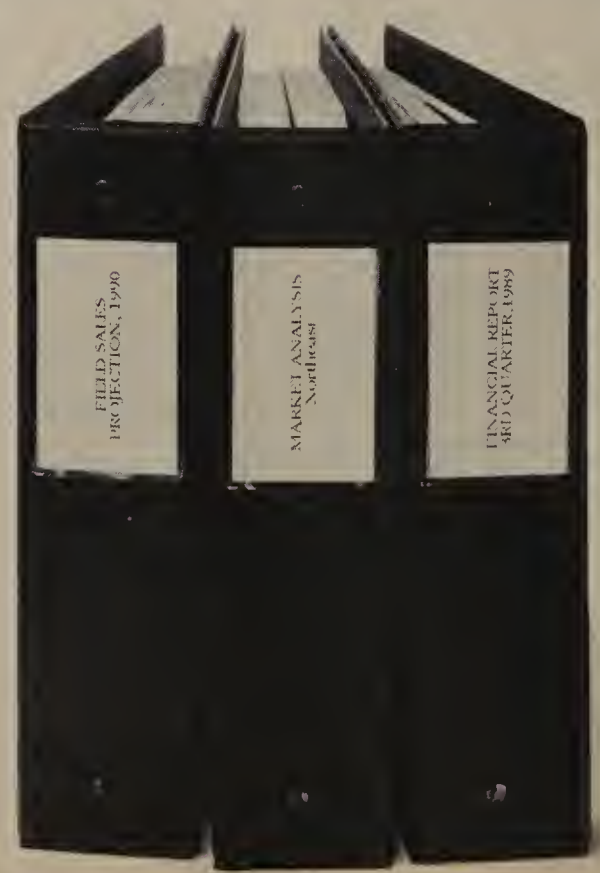
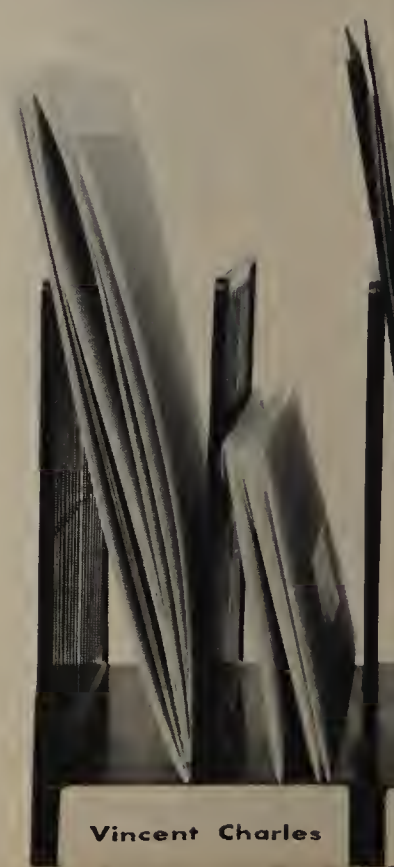
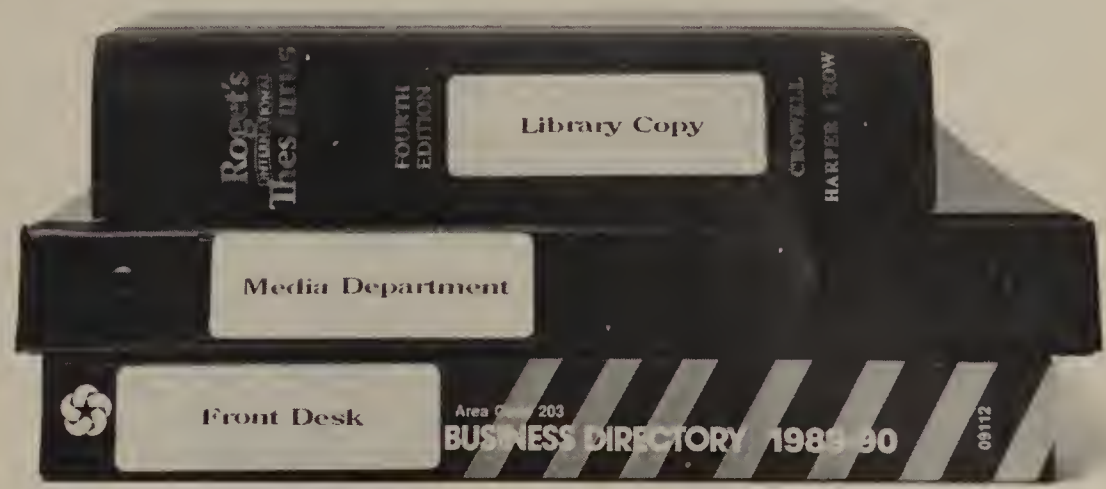






need a label printer for?



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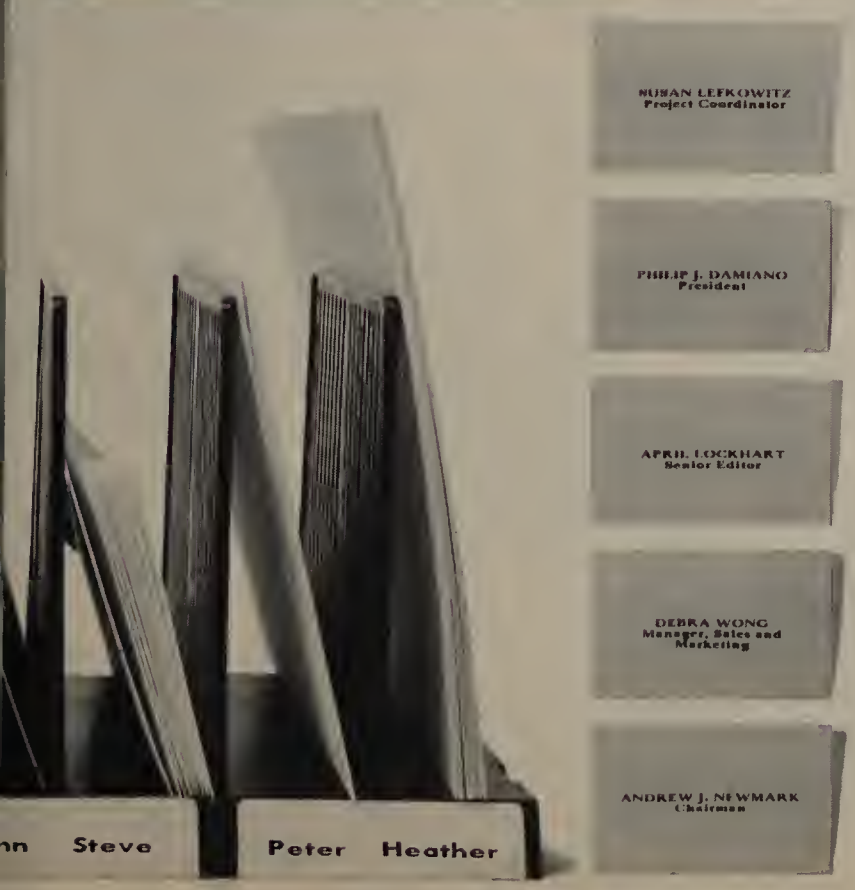

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third. We worked all night, but I went to bed at three in the morning. Doug and some others kept working. We lived and worked in the same place.

As I ran out the door the next morning to make the plane, they showed me what they came up with: Mr. and Ms. in bed, jumping around, going at it. I nearly died. I went to the meeting not knowing what the screen would actually do when I made the presentation.

My second favorite story is about the time I met with Jean-Louis Gassée and Al Eisenstat, just after Jean-Louis came to Cupertino. Gassée agreed to license the Mac OS to GCC because Apple wanted access to the HyperDrive technology. They backed out of that like crazy when they figured out what they had done.

MW *What do you think of the transportable from Apple?*

CURRAN The laptop Mac was long overdue. I didn't think it would take so long to bring it to market. Some people say the trackball is difficult to use; I don't find that so. Maybe it's my experience with video games. We developed the $579 Write-Move ink-jet printer in response to Apple's request that we develop a printer along the lines of our PLP to go with their laptop.

MW *What about the technology of the Portable?*

CURRAN It's a good first attempt. The product should be able to be made lighter and more portable, closer to the idea of a laptop computer.

MW *Why is the product so expensive?*

CURRAN What can I say? It's disappointing to me that there is no support for the color ROM, which is an unbelievable shortcoming. You want to have a color monitor that you can attach to the machine at work and then carry the machine with the built-in black-and-white screen. The price is disappointingly high. But there is a market and you'll see acceptance of the machine immediately; the entire initial production run will be sold. The real question is when the revision that will support system software 7.0 and color will be out.

MW *When will we have 3½-inch erasable optical technology for the Mac?*

CURRAN A 3½-inch drive is definitely practical technology. The 3½-inch is basically the same technology as the 5¼-inch. I believe some companies have demonstrated the technology, where you get less storage at the same aerial density on a 3½-inch disk. I wouldn't be surprised to see a product within one year.

MW *Why have so many Apple peripherals been unsuccessful?*

CURRAN You can't generalize and say they're all bad. The original Apple LaserWriter was a great product that required vision. At $7000 lots of people were claiming that the resellers couldn't move it. Now it's the single most successful peripheral that Apple has produced.

The IIcx is going to take the Mac further into corporate America than ever before

You're right in general that Apple peripherals are not as good as they could be, but it allows opportunities for companies such as ourselves. Apple puts its best people on the Mac OS and CPUs and leaves innovation in peripherals to third parties. It's not uncommon for Apple to invite third parties to make a product and to then emulate them when the market is successful enough to warrant Apple's corporate scrutiny.

MW *The scanner hasn't been successful. Is it due to the scanner market?*

CURRAN I think that scanners have been more successful on the Mac than on any other CPU to date. The real issue is what use the average Mac user can make of them. If you had a built-in facsimile and modem on a laser printer, and remote users could access them all in one workstation, that would be very useful.

MW *GCC started the hard drive market for the Mac, but others, such as SuperMac and Jasmine, have been more successful in it. How have they done this?*

CURRAN Actually Davong and Corvus were out when we entered the market. We started the internal drive market with a product that was well integrated into the Mac OS. HyperDrive was right from a software point of view and user response time. The external drives sold by other companies used the serial port and were all but worthless.

As for SuperMac and Jasmine, you have to look at them separately. SuperMac quickly jumped on the SCSI port on the Mac Plus and maximized the return on that port. We were slow to the market with SCSI products. I like to feel that we have avoided some of the mistakes that SuperMac made in its product line, but looking back I wish we had gotten into the SCSI market faster.

MW *And Jasmine?*

CURRAN Its secret to success is in its direct response marketing. Jasmine products historically have been sold directly to the user, except for a handful of renegade dealers, six of them. All of the company's marketing and sales efforts focused on direct sales. Because of its direct sales effort, Jasmine came across as a bigger company than it was, until the point where it grew to be a large company. Its success in selling direct was a factor in our entering that market in August.

MW *What would you do as CEO at Apple?*

CURRAN First, in product development I would work hard to push the Mac down in cost to reach the valuable home and education market. There is no reason why there is not a Mac under $1000, especially as the Apple II is dead.

Second, I would push Mac technology in performance. The Apple market is desperately in need of a true multitasking operating system. The lack of multitasking is the most serious shortcoming for the Mac in penetrating corporate applications.

Third, I would focus Apple's advertising and PR on the enormous benefits the Mac still offers over DOS-based PCs on the market today. Anyone coming from

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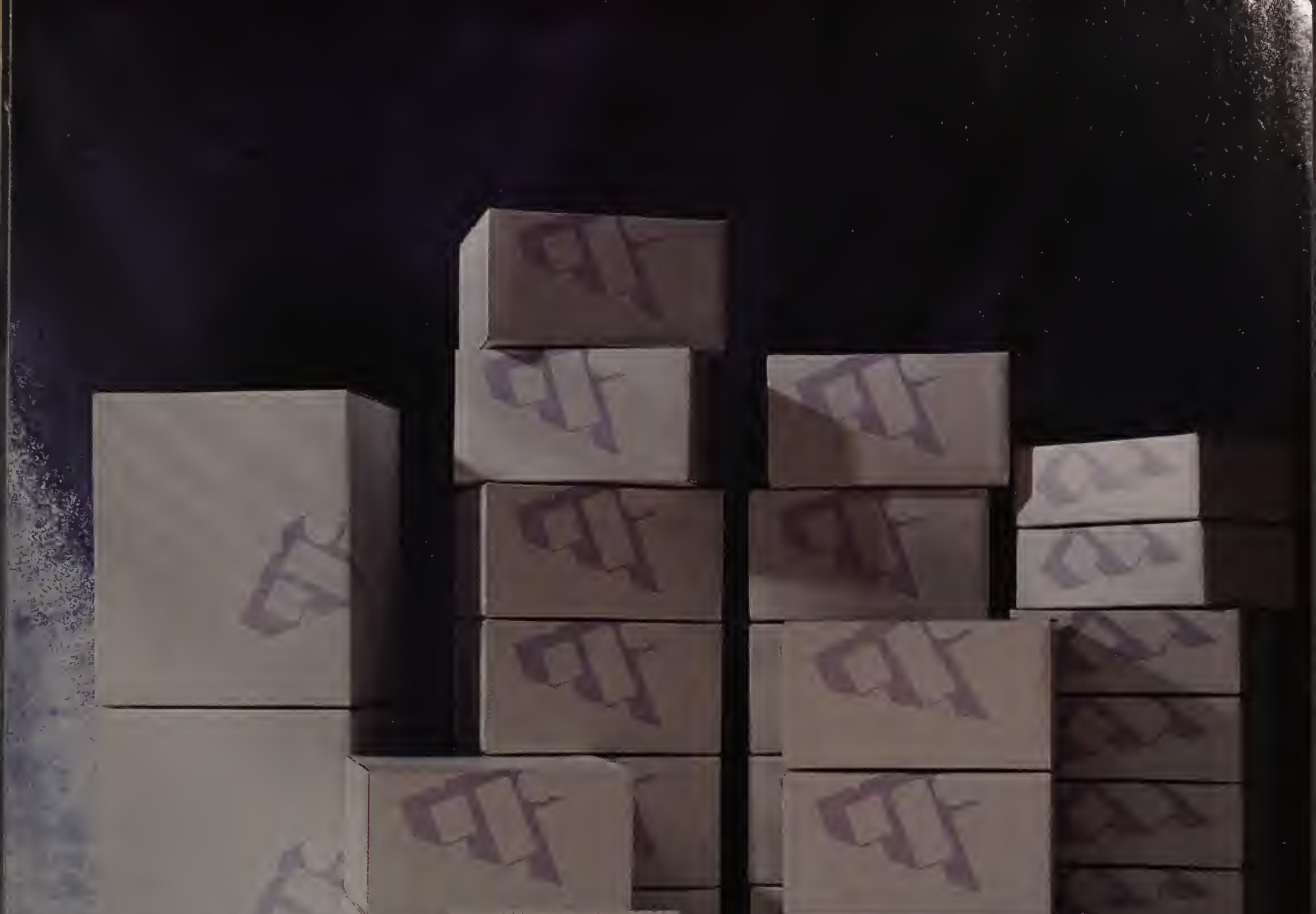

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the Mac using OS/2 machines recognizes the shortcomings of their interface. The other day I was using a PS/2, and I was unable to save a spreadsheet with the phrase "cash flow." The prompt came back with an error message but wouldn't tell me how to rectify the problem. The problem was that the string was one character too long and apparently an embedded space is verboten in the DOS world. This is a problem for most users.

Fourth, I think Apple should give serious consideration to licensing the Mac technology to third-party developers to develop specialty Macs that Apple won't get to. Where a market is too small or Apple doesn't have sufficient experience in a market. For example, a Mac engineering workstation to compete with Sun.

MW *What does Apple's CPU architecture of the future hold?*

CURRAN Apple's CPU architecture is wedded to Motorola 68000 development directly. Motorola is sure to protect its multibillion dollar business, pouring money into CPU extensions just as Intel is doing with its 8086 family. I think that Motorola fulfills most of Apple's needs in the near to midterm future.

High-performance engineering workstations are also 68000-family based, and as such there is nothing inherent in Motorola's technology destined to limit the Macintosh's success. For example, the Motorola product family supports true multitasking. The question is whether Apple will support it. A similar point could be made with high-performance graphics: the question is when Apple will support it rather than whether Apple will have a product. Furthermore, given Apple's status as a client to Motorola, there is no reason why the Austin microprocessor group in Motorola could not develop application-specific support chips for Apple should the need arise.

MW *What do you think of the new version of the IIcx?*

CURRAN The most interesting feature of the new IIcx is the onboard support of 8-bit video. I think overall that it's wonderful. The IIcx is the most popular Mac CPU on the market today.

MW *What does 8-bit video on board portend?*

CURRAN Apple is able to bring out products that are competition to third parties. The same thing happened in the IBM PC market. All of the functions of AST's Six Pack Plus [one of the largest-selling add-on boards for the PC] were incorporated into subsequent IBM PCs. This is an example of one way Apple can make life difficult for third-party developers, that is, eliminate their market.

MW *Will Apple's introduction of the Portable drive third parties from the market?*

CURRAN It does pose enormous difficulties for third-party developers in the Mac market. At the end of the day, Apple cares more about itself than anyone else. To be a success in the third-party peripheral and software business, one has to work hard to stay ahead of Apple.

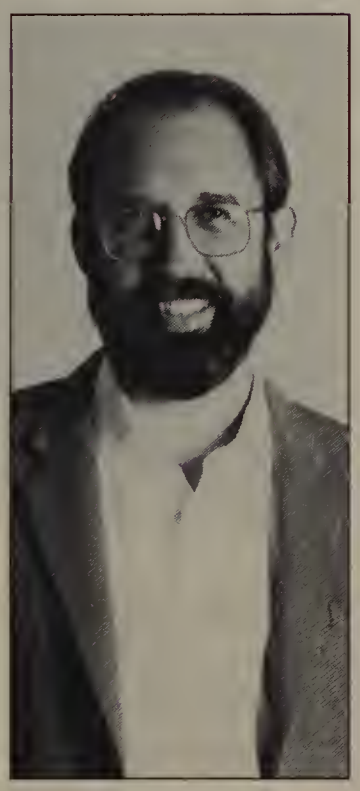
System 7.0 is a complete vindication of the print model we adopted

Apple itself needn't worry that third parties will go away. The glamour of this business, if I can call it that, attracts new third parties on a constant basis. That's obvious to those of us in this business for a long time. We've learned to work in that environment, but we're challenged nevertheless. One thing I concern myself with is developing innovative products within Apple standards and keeping the products useful that we bring out in the future, like the PLP, which will support 7.0.

It's important to give the customer ongoing support. That should be a key customer issue at the time of purchase. There is a need for companies to provide updates and support to products as Apple changes directions. We have over 100,000 products in the field today, and we have a responsibility to keep them up to date. ■

Interviewed by Jerry Borrell

IT TAKES A CERTAIN TYPE TO MAKE A STATEMENT THIS BOLD.



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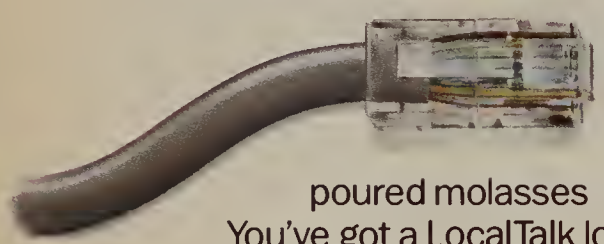
Your desktop publishing department is growing. So is your AppleTalk network. Only now you're about to produce the company's biggest ever annual report. You're right on schedule when suddenly, it feels like someone poured molasses in the network.



You've got a LocalTalk logjam. Sound familiar?

You call Harrington, your network whiz. On his Macintosh, Harrington brings up Farallon's TrafficWatch software. Using TrafficWatch, he can analyze traffic patterns and check the placement of servers and routers. Everything looks fine. LocalTalk just can't handle the traffic.

Ethernet is the answer. But does everyone have to have it? And can you run Ethernet and LocalTalk together? Harrington is a smart guy. He draws a simple picture on the chalkboard. It looks easy. Looks fast. Looks affordable. How do you do it?

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Imagine, now you can run high-performance Ethernet for people who frequently access a central database, transfer large graphics files or operate network-intensive applications, such as CAD or desktop publishing. And run low-cost LocalTalk for everyone else. All on the same wiring system.

Running two well-defined standards like Ethernet and LocalTalk also means your network is compatible with Macintoshes and IBM personal computers, NeXT and Sun workstations, laser printers and DEC VAXes. And everything will communicate using popular network software, such as AppleShare, 3Com 3+, TOPS and Novell Netware.

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If you think hybrid networks make sense, here's an even more sensible idea: active star networks over twisted-pair telephone wire.

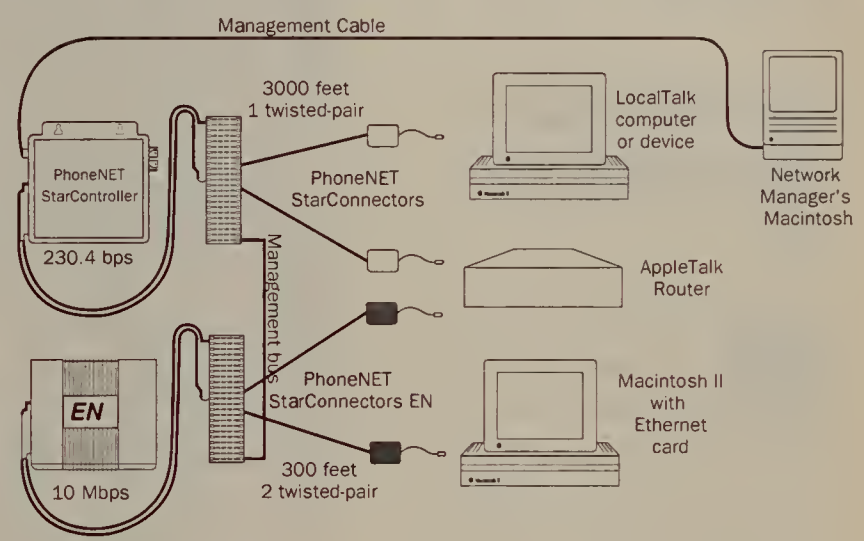
Stars are the standard for telephone networks, with cables running from the phone closet out to each desk. The PhoneNET System uses this same cabling for your computer network.

Which means if you already have a LocalTalk network using the PhoneNET System, then creating a hybrid LocalTalk/Ethernet network should be easy.

Manage to stay in control with StarCommand 2.0.

Of course, a larger, faster network requires more management power. Our StarControllers have been designed to make it easier and faster to isolate and fix problems without disrupting the network.

ethernet.



StarController EN:

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For example, our StarControllers automatically turn off jamming ports on LocalTalk and Ethernet, thus protecting the rest of the network, and turn them back on when the jam clears.

Plus, each StarController comes with StarCommand 2.0 software, which continuously monitors the network and alerts the network manager to any problems. Running under MultiFinder and password-protected, StarCommand will isolate and diagnose problems without interfering with the rest of the network. And since it works over a dedicated management bus, you can troubleshoot even if the network is down.

You say Ethernet, we say Eithernet.

Look at it this way. Even if you're doing more things on AppleTalk than ever before, chances are only some of your people are facing critical mass. Everyone else is perfectly happy and productive. So rather than installing Ethernet everywhere, maybe you should consider running both LocalTalk and Ethernet. At the same time. Over the same network cabling. With the PhoneNET System.

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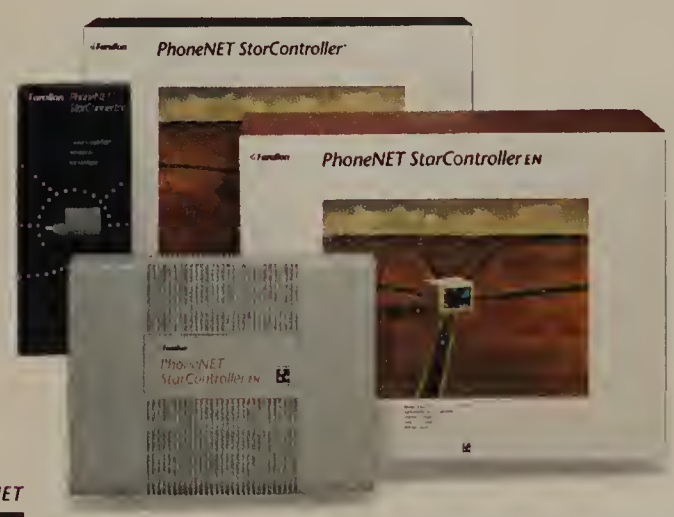

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MACWORLD NEWS

by Dan Littman and
Tom Moran

Apple Introduces a High-Performance IIcx

Buying a Mac IIcx, but wish you could get more power? Apple's latest rendition of this wildly popular modular Mac gives you plenty of extra speed, but without sacrificing all-around performance. Dubbed the IIci at press time, it incorporates all the features of the IIcx along with a faster processor, a slot for a high-speed RAM cache, and a built-in 8-bit color video controller. It's a classic design that just keeps getting better.

To begin with, this new machine includes a 25MHz 68030 processor running at 1.5 times the speed of the IIcx, plus a 25MHz 68882 numeric coprocessor to speed up floating-point calculations.

Besides the faster processor chips, 80-nanosecond DRAM chips for the main memory, and a parity option for RAM, Apple engineers have added a new 120-pin slot for a high-speed memory cache, a feature common to many RISC-based workstations. In some computer designs, a speedy processor wastes time waiting for instructions or data from slower memory. With a memory cache, a small block of fast memory is set aside to be ready and waiting with the information most likely to be requested by the processor. Apple estimates that the optional cache memory can speed up processing by 10 to 20 percent.

MARK JOHANN

Apple's faster version of the Mac IIcx includes a 25MHz 68030 and 8-bit color capability.

Third-party manufacturers such as Daystar Digital are already at work designing cache boards for the new machine. The size and speed of the cache will, of course, depend on a manufacturer's design. Apple's own board, which is scheduled to ship after the first of the year, will provide 32K of fast (25 nanosecond) static RAM.

Built-in Color

The newest modular Mac contains another first. The main board includes the circuitry necessary to display up to 256 colors on an Apple or third-party video monitor. This simply means that you don't have to purchase a NuBus video board. It also frees up a NuBus slot for other boards, while providing faster display performance in black and white and 4 or 16 colors. The faster performance stems from some clever architectural changes on the part of Apple's engineers (see "Built-in Video").

When displaying 8-bit color images on the 13-inch Apple Color Monitor, the video memory occupies 320K of main memory. A black-and-white image on the same monitor uses only 64K, while images displayed on the Apple Full Page Display occupy 96K. Because the video circuitry automatically senses which Apple monitor is connected, you just plug in the monitor and it's properly configured. Third-party monitors, however, may require a special adapter cable to operate properly with the built-in video. NuBus video boards work just as before—you can add up to three additional displays.

Performance

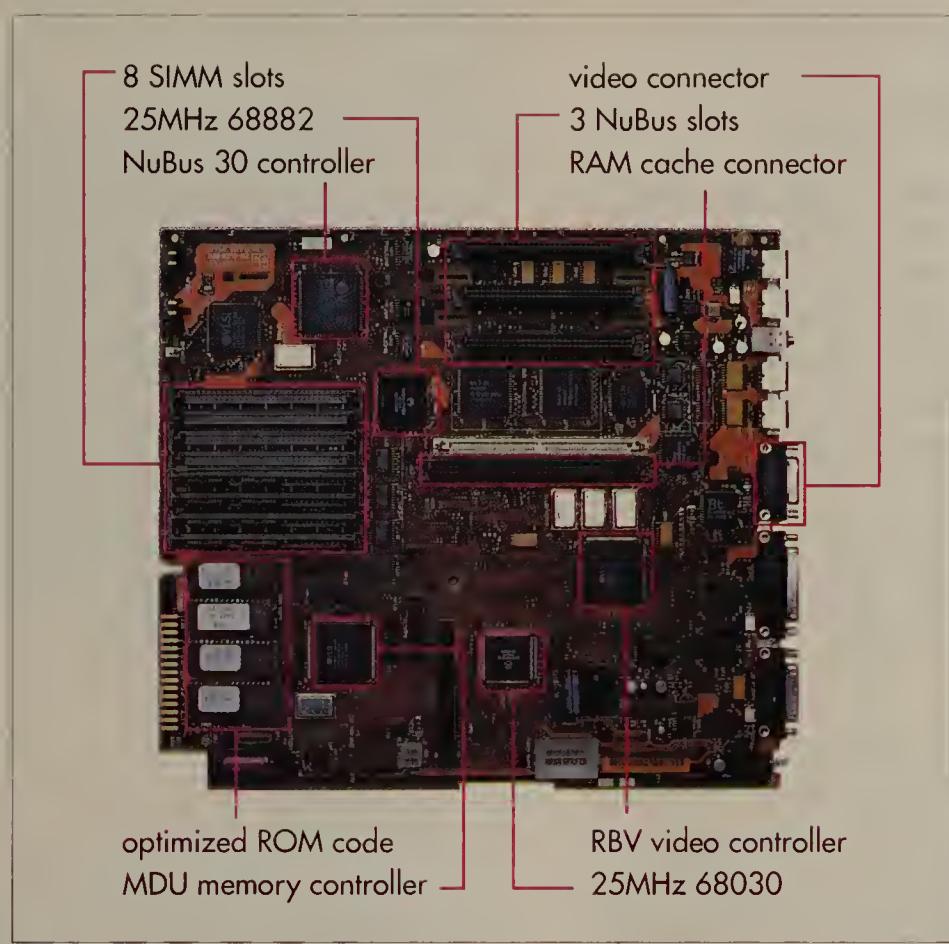
The performance of the new machine depends on three factors: the increased CPU speed, the cache board, and the on-board video. Beyond the 1.5 times increase in speed due to the new CPU, performance is largely influenced by whether or not you install a cache board and how you configure the on-board video (see "Mac IIcx vs. Mac IIci"). I ran the ma-

chine in black and white with the Apple cache board installed, and the performance was stunning—it's the fastest Mac I've ever used. Graphics operations were incredibly quick. I also ran the machine with Raster Ops's new 24-bit color board (under $1000), and that too was incredibly responsive, as much a tribute to the board's design as to the faster CPU.

In general, you get the fastest performance by installing a cache board and setting the on-board video for black and white. When you're displaying 8-bit color, NuBus video boards can provide faster performance than built-in video.

Expanded ROM

The new Mac comes with 512K of ROM, twice the ROM space available in the IIcx. The major changes to the ROM-resident Toolbox routines pave the way for System 7.0, which is scheduled to ship early in 1990. The IIci requires System 6.0.4, as well as version 1.2.3 of HyperCard.

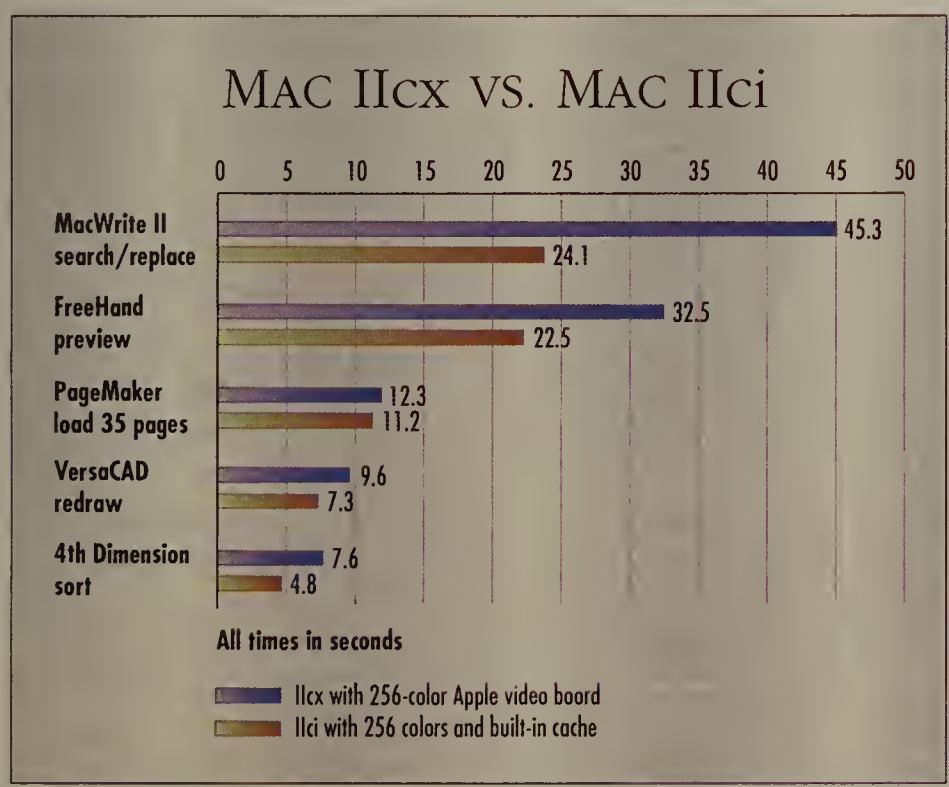


The IIci includes a new custom video chip, the RBV, and a memory controller, the MDU.

Most existing applications that follow the rules for 32-bit addressing should run, however. But those that run afoul of Apple's new addressing laws may suffer some compatibility problems.

All Toolbox routines can now address up to the entire 4 gigabytes of memory using full 32-bit addressing. Equally significant is the use of the 68030's on-chip memory management unit (MMU). In preparation for the virtual memory features of System 7.0, the MMU translates, or maps, all addresses from physical to logical addresses. For example, to make room for the on-board video memory, the MMU now maps the contents of low memory—previously used by the operating system—into the high memory normally reserved for NuBus boards.

In addition to being optimized for better performance, 32-bit Color QuickDraw routines now reside in ROM. Burst mode, a feature of the 68030 that can account for about a 10 percent improvement in performance, is now possible for all Toolbox routines that need to move large blocks of data very quickly.



The applications we tested ran from about 9 to 46 percent faster on the IIci than on the IIcx.

More Speed, Fewer Parts

Manufacturability, a key concern in the drive to reduce costs and a major factor behind price reductions, is another area where Apple has made big strides. The main board of the new machine contains more functionality with fewer parts than its predecessor. The machine now contains 13 Apple-designed custom Very Large Scale Integration (VLSI) chips, all packed onto a board that in engineering circles qualifies as a work of art. New chips include the RBV, the MDU, and a new NuBus 30 controller chip that handles the NuBus arbitration and protocols. Although Apple has added its own NuBus controller and interface chips, the existing 10MHz speed of the NuBus remains the same.

Storage features also remain the same as on the IIcx. The new machine comes with the FDHD floppy drive and an optional hard disk. The basic machine comes with 1MB of RAM and can be expanded to 8MB with 1MB SIMMs.

Upgrades and Price

Comments by Apple marketers prior to the announcement suggested that the machine would be expensive. Apple also indicated that an upgrade would be available—a switch that would involve swapping the logic board and RAM SIMMs, as well as the bottom of the case.

In short, Apple has at long last brought the Mac up to a performance level that competes with workstations from Sun and Next, as well as with DOS machines based on 25MHz and 33MHz Intel

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Nation's Most Popular Macintosh Training Workshops Now On Video

DAYTONA BEACH, FL- Twenty MacAcademy™ workshops are now available on video tape. This valuable and exciting new video training series came as a result of a request from Helena, Montana.

One day we received a call from a gentleman wanting more information on our MacAcademy training locations. As you may know, MacAcademy teaches people how to use the Macintosh computer. We teach a lot of people, over 18,000 each year, in 65 major metro areas. We're proud of the fact that both beginning and advanced Macintosh users, all over the country, have found MacAcademy to be an excellent, low priced, training solution.

The gentleman wanted to know when we would be presenting MacAcademy in Montana. Sadly, I had to tell him probably never. There just aren't enough Mac users in Montana to make a workshop financially feasible. I told the caller he could attend in Denver or Salt Lake City, but he still didn't seem satisfied. Finally, he said that if we ever put the workshops on video tape he'd be glad to invest in a set. What a great idea!

Now our training videos are being used by thousands. Not just people who live in Montana, but by MacAcademy graduates, large corporations, school districts, and Mac users in all lines of work.

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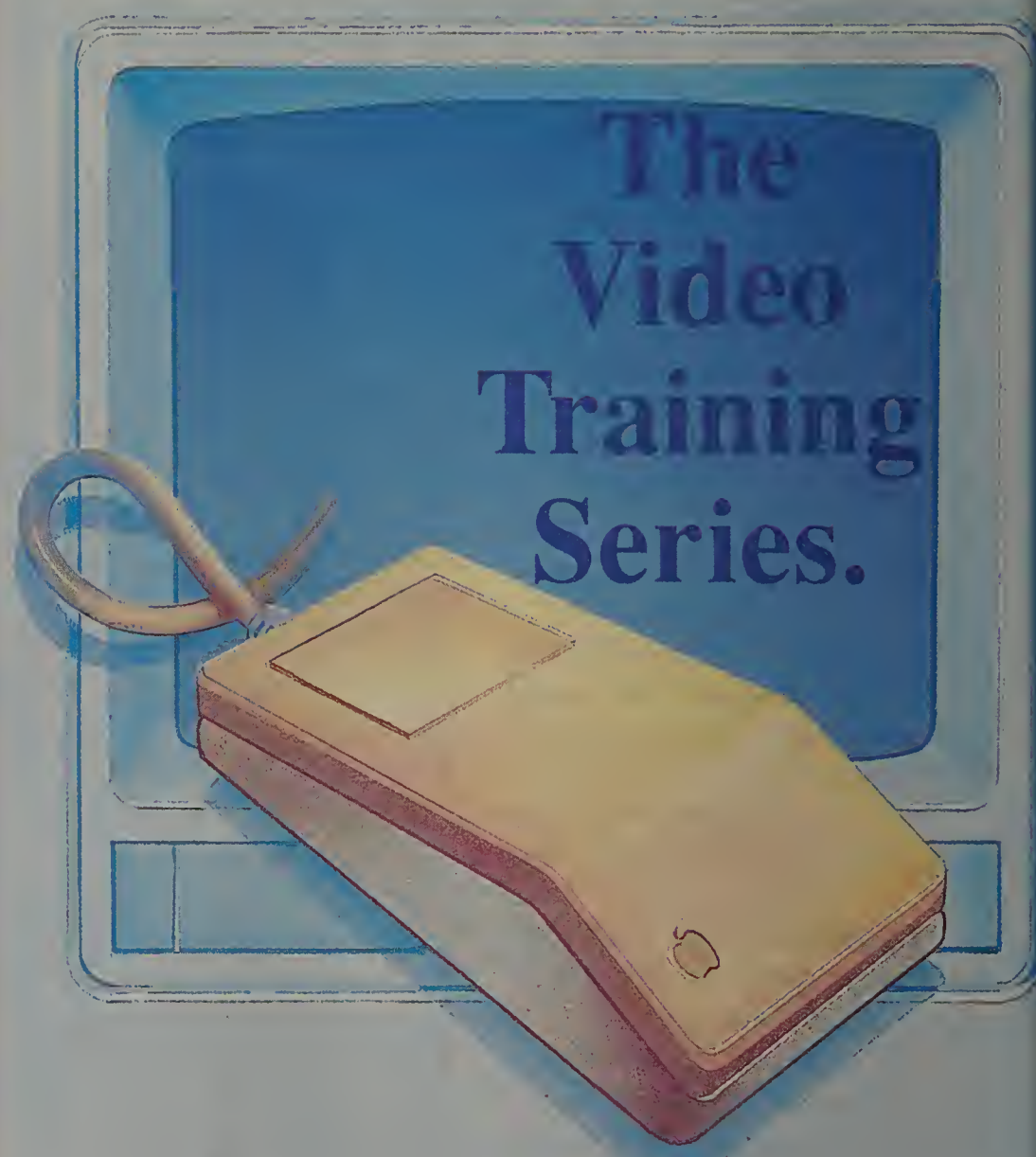

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BUILT-IN VIDEO

As in the current IIcx, main memory is divided into two banks. With the IIci, however, the bank containing the lowest memory addresses stores the video image as well as the instructions and data for the CPU. Using DMA (direct memory access) techniques, a new custom memory controller, the MDU (Memory Decoding Unit), transfers video data 256 bytes at a time from the lower bank to a new custom video controller chip, the RBV (RAM-Based Video controller). The RBV sends out the video data synchronized with the monitor's scan rate. An on-board digital-to-analog converter chip with color lookup tables then converts the RBV's video data to the analog signals necessary to drive the monitor. Black-and-white images stored in main memory are displayed much faster than images from a NuBus video board, due to the fast DMA capabilities of the MDU and RBV chips.

CPUs. At the right price, the new machine could be the most popular Mac yet. If you need optimum performance, and you're willing to pay what's expected to be a premium, Apple's new machine is a winner.
—David Ushijima

Midrange DTP from Silicon Beach

As the sophistication and cost of PageMaker and QuarkXPress have begun to leave some desktop publishers behind, midrange products are popping up to fill in the gap. In July, Timeworks released its $395 Publish It, and by the end of October, Silicon Beach plans to ship a product that will probably list for $299.

The as-yet-unnamed Silicon Beach product uses a friendlier version of Quark's box-oriented metaphor for pasting up text and graphics. The program can draw the boxes for you, on the fly, as you import files, and instead of parent-child relationships, it provides a separate pop-up window to keep track of links between blocks of text. You can number each box and save a complete layout as a template. Templates appear in the Open dialog as thumbnails, and without opening a template, you can assign text and graphics to pour into the boxes by number. This process can be automated for cloning and updating tightly structured documents. The program features pop-up note windows, and a built-in Scrapbook-like file for storing graphics and chunks of text with a document.

Silicon Beach's DTP product lacks the fine typographic controls of the high-end programs. It imports WriteNow, MacWrite, Word, and RTF files. Text processing features include a spelling checker, a thesaurus, and the ability to search and replace by characteristics. The program has somewhat primitive style sheets that don't update formatted text when a style's definition is changed.

The product imports graphics in TIFF, PICT, EPS, and Digital Darkroom's compressed Archive format. The program displays 256-color files but doesn't do four-color separations. Spot colors can be assigned to eight layers, but at press time, Silicon Beach had not resolved some color issues. A set of draw tools is available, and like Silicon Beach's Digital Darkroom, the new package accepts plug-in modules for special capabilities, and some Digital Darkroom modules will plug right in, for example a scanner driver that lets you scan directly into a page layout. For more information, contact Silicon Beach in San Diego at 619/695-6956.
—Dan Littman

Silicon Beach's new desktop publishing package provides pop-up notes and can use plug-in modules from Digital Darkroom.

RetixMail Brings X.400 to the Mac

Retix has released the first X.400 electronic mail package for the Macintosh. X.400 was designed by CCITT—an organization that sets international telecommunications standards—to be a common language or set of protocols that allows electronic mail systems to talk to each other, much as different countries' phone systems do. Mail systems can speak X.400 either by going through a translator, called a gateway, or by being native X.400 speakers. RetixMail for Macintosh is the first product that speaks native X.400.

X.400 defines two types of interactions in electronic mail. The User Agent portion of the protocol allows people to compose, read, and file mail; the Message Transfer Agent (MTA) part of the protocol stores, forwards, and routes messages. X.400 specifies how User Agents talk to MTAs, and how MTAs talk to each other. RetixMail's MTA is called RetixMail OpenServer 400. It requires a dedicated IBM PC on the network to store, send, and receive mail. Retix does not plan to build a version of OpenServer 400 for the Mac.

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GIVE YOUR EYES A BREAK

If you need color on cue for desktop publishing, CAD/CAM, presentation graphics or any other task requiring the most realistic images possible, the PCPC II/32 High Resolution Color Graphics System provides the power and performance to capture every shot. Crispness and brillance are yours as never before. Need colors, and lots of them? You can choose from almost 17 million different ones. With this kind of real-time quality, you are free to pool all your resources and be the best you can be. And all this happens on an absolutely flicker-free Trinitron™ monitor with a picture so sharp it must be seen to be believed! Down time? With the PCPC II/32, down time is all but a thing of the past. What could be better? More personalized choices, of course - just to ensure that you have your ideal system - a super workstation or executive center - PCPC offers two monitor sizes, so don't get hustled. If the color of your money is important to you, give your eyes the break they deserve!

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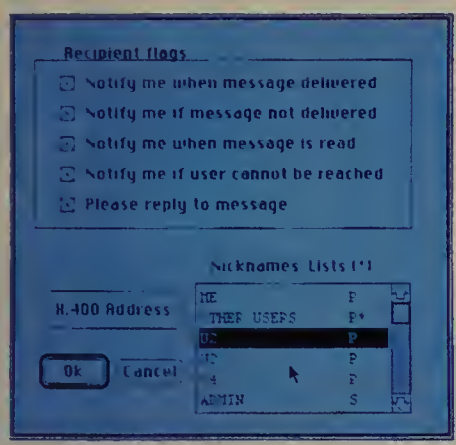


RetixMail is the sole Mac E-mail package supporting all these X.400-standard features.

RetixMail features can be customized. You control how often you will be notified of new mail, and options for how it notifies you include sounds, a pop-up dialog box, and turning the Apple icon into an envelope. A nickname feature allows you to send mail without typing in a full address each time: you simply enter the full address in an address book, give the entry a nickname, and send mail to the nickname.

A 100-user RetixMail package is available for $7300, including the Retix OpenServer 400 server and an adapter for connecting to other networks. For more information, contact Retix in Santa Monica, California, at 213/399-2200.
—*Yvonne Lee*

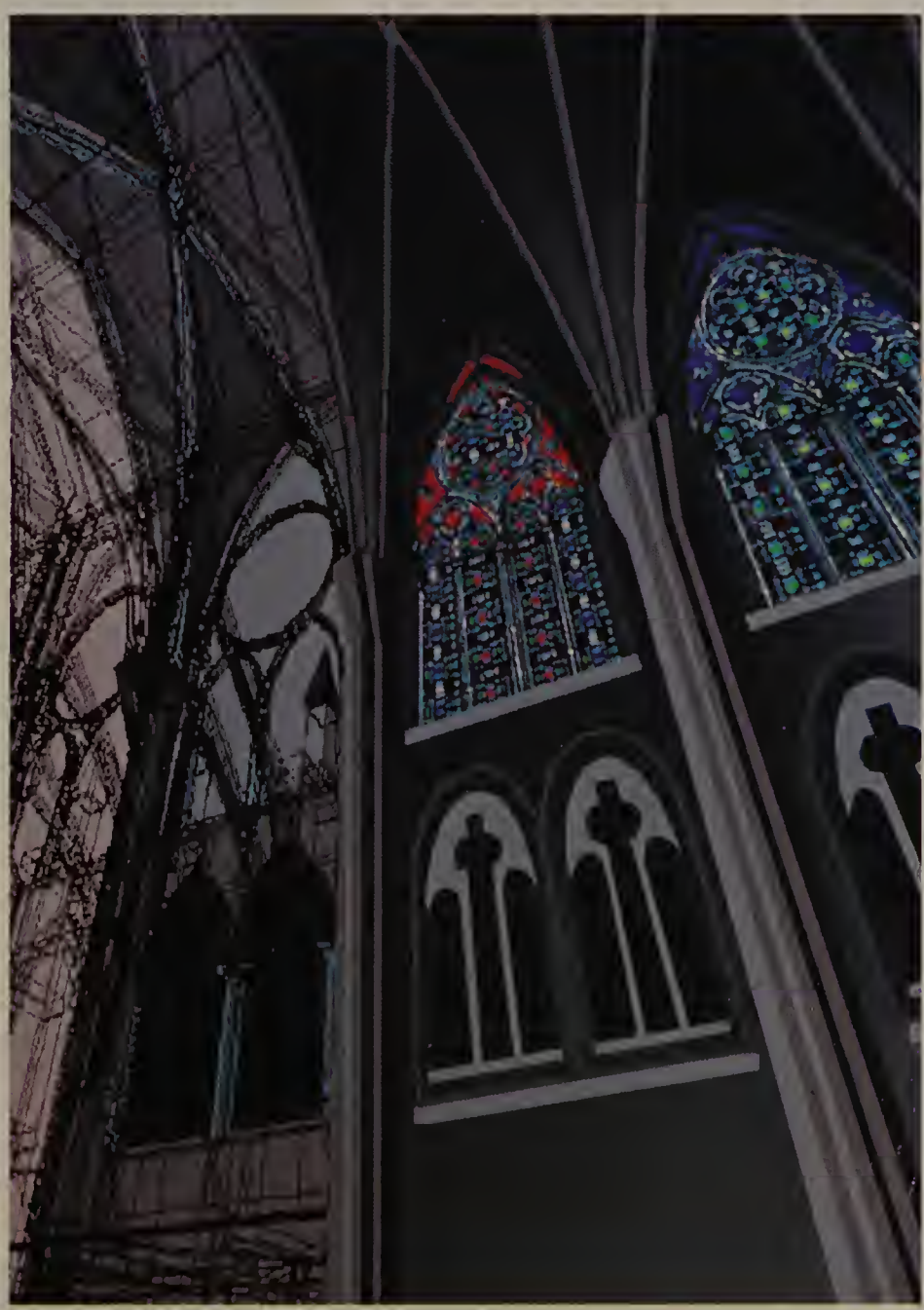
ModelShop: 3-D in the Fast Lane

ModelShop 1.0 is designed to simplify knocking out rough ideas for buildings and playing with objects in 3-D. To draw a building or an object, you start in plan view and throw down a rectangle or another primitive shape, or you can draw a complex shape with the line tool. A rubber-band line appears and you drag-click it to set the height. Another drag-and-click line sets the center of view and standpoint location, or you can enter exact numbers in a dialog box. Once you create an object, you can drag its vertices around and punch holes through it to create windows and hallways—or the mouth of a disk drive. Holes can be moved by dragging and ModelShop reconstructs the surrounding walls.

You can stop rendering at any point to work on a partly rendered model. ModelShop's color scheme is based on HSB (hue, saturation, brightness) and is limited (by 8-bit color) to seven colors per file, each with 32 brightness levels. It imports PICT files or scans. Final images can be saved as a high-resolution PICT2 files for page layouts, or output to film recorders.

Some useful features slated for versions 1.1 and 2.0 include transparency, multiple light sources, object libraries, DXF 3-D translators for exchanging files with technical CAD applications like AutoCAD, and 32-bit color support. ModelShop currently supports 235 layers; in later versions you will be able to name layers individually. The view from inside a 3-D object leaves a lot to be desired, and Paracomp plans a major overhaul for that function. The company also publishes Swivel 3D and plans to integrate the two products to provide animation and walk-through capabilities for ModelShop creations.

ModelShop lists for $595 and should be available now. It runs on a Mac Plus and is MultiFinder-friendly. For more information, contact Paracomp in San Francisco at 415/543-3848.–*D.L.*



The interior of the cathedral at Amiens as recreated in ModelShop by architectural illustrator Sandy Chase.

Matching Colors on Printers and Monitors

Tektronix recently introduced a method of matching the color output of printers and monitors. Called TekColor, the software displays a map of colors possible on an output device, overlapped with a similar map for the monitor. By working in the area of overlap, users choose monitor colors that the output device can produce.

The first annnounced method for matching monitor color with color output, TekColor should be extremely useful for graphic artists and color desktop publishers. The technique requires that the maker of the output device define its color characteristics under Tektronix's TekHVC (hue-value-chroma) color model, or under the CIE international color definition standard. TekHVC is a patented subset of the CIE standard. Tektronix's ColorQuick ink-jet printer's performance has already been mapped under TekHVC, and other vendors are expected to

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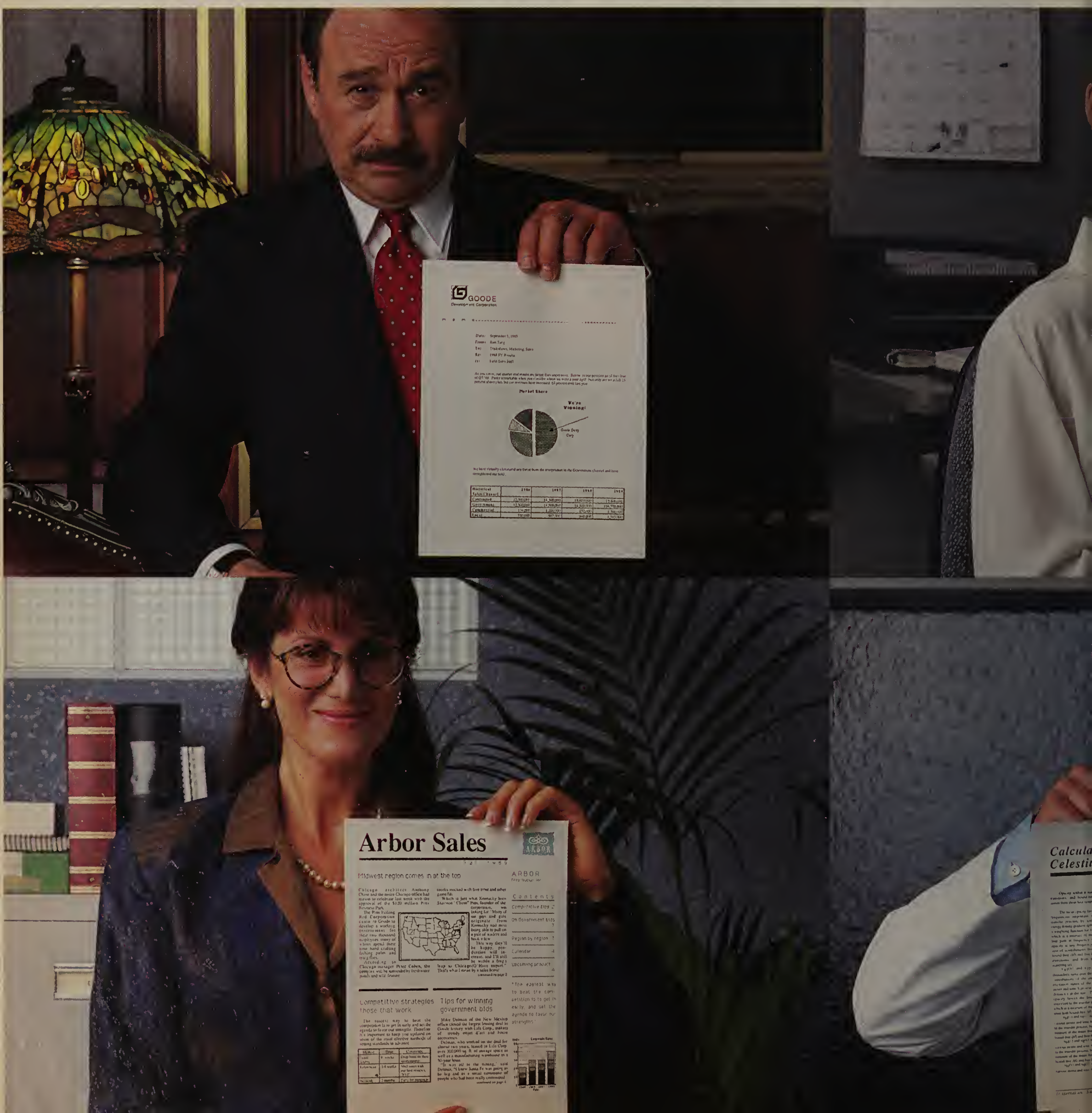
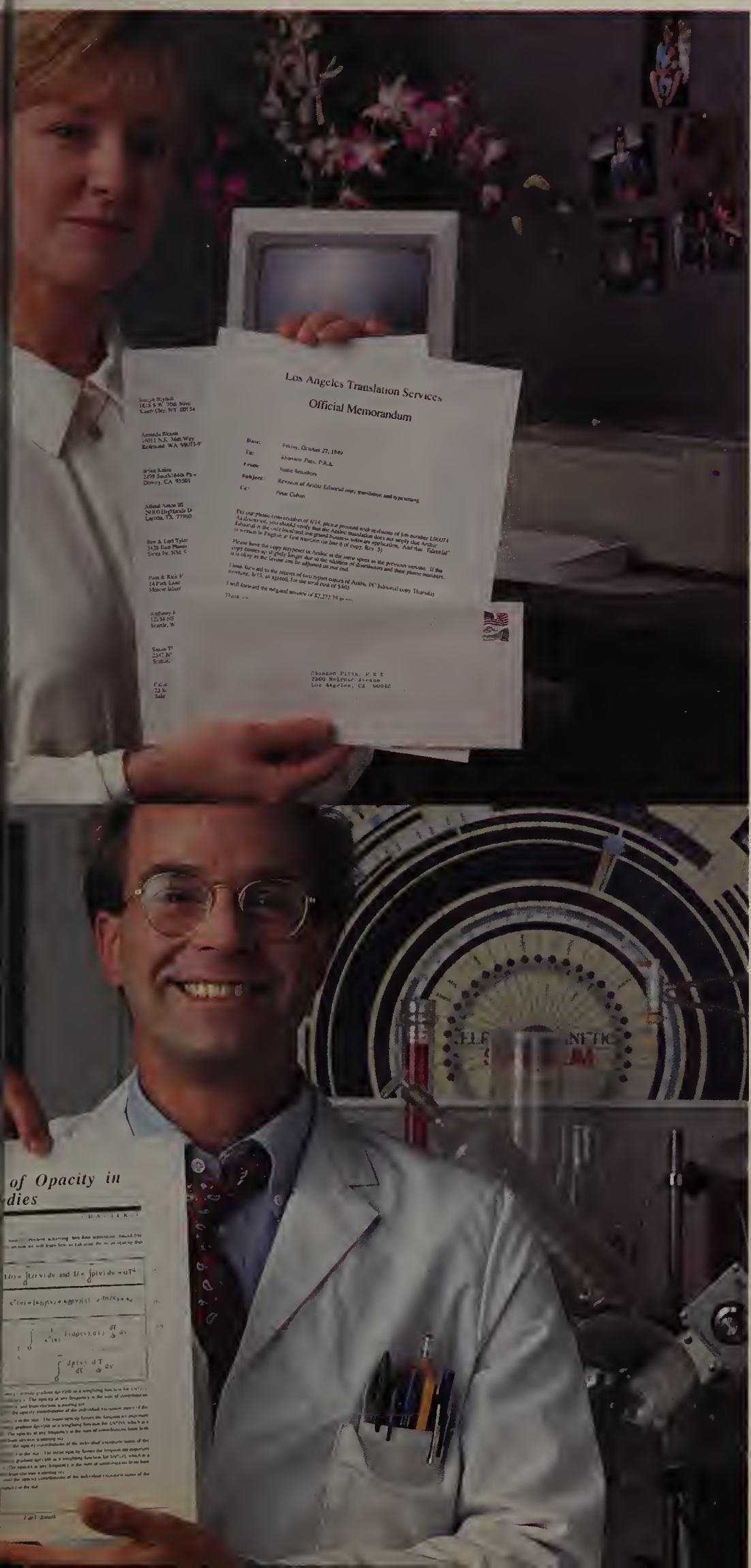
There's a Word fo



r people like you.



Whether you're a marketing maven on your way up, a scientist knee-deep in formulas, or a temp trying to cope with an unfamiliar corporate mindset, when it comes to putting thoughts to paper, Microsoft is the Word for you.

And our users aren't the only ones who think so. Recently, the editors of *Mac User* gave Microsoft® Word version 4.0 the highest rating of any Macintosh® word processing program. Period.

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All of which has led to innovations like Word 4.0's powerful Table feature, enabling users to create side-by-side paragraphs, lists and even forms, without the hassle of dealing with tabs.

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For something a tad more informative than this ad, call (800) 541-1261, Dept. J92, to receive a brochure or ask for the location of your nearest dealer for a demo. You'll find that no matter what type of word processing you're performing, you could be doing it better.

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RODIME'S COMMITMENT TO QUALITY. At Rodime Systems, the craftsmanship built into every drive is our commitment to produce the finest, most reliable drives available. When you buy a Rodime Systems product, you are buying years of manufacturing experience, state of the art engineering and peace of mind that comes from knowing that more Mac users have chosen Rodime drives than any other.

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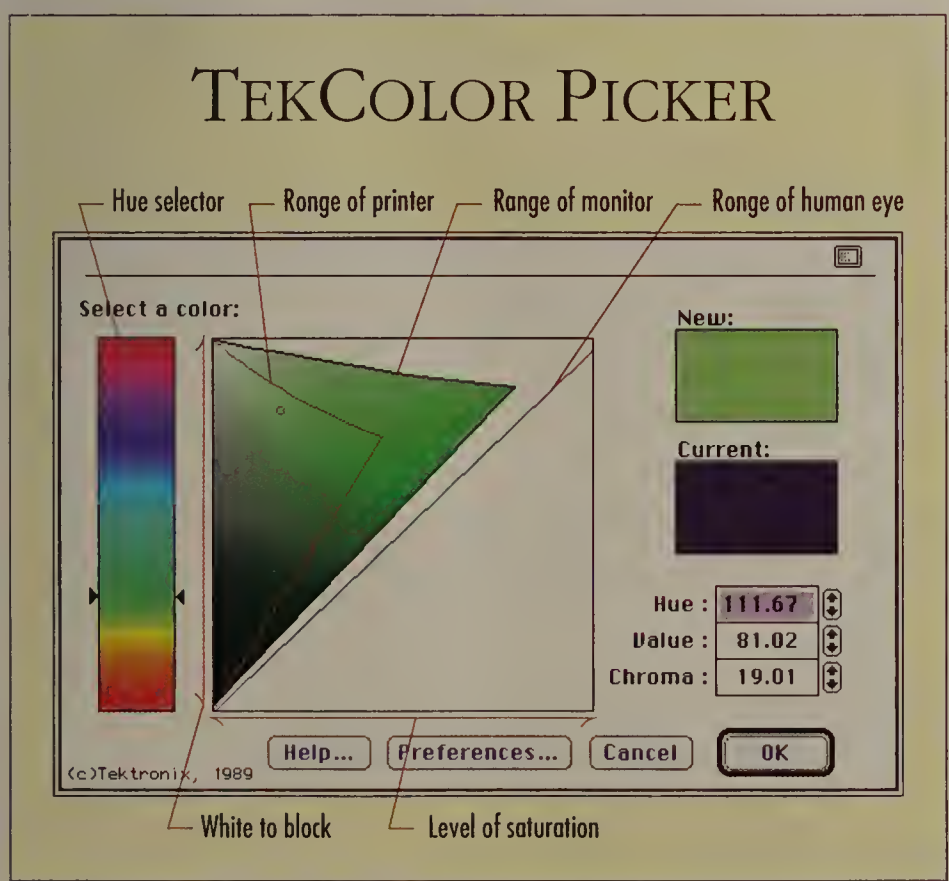
announce their support soon. Although Tektronix holds a patent on TekHVC, the company will publish the specifications for it and for TekColor in hopes of creating an industry standard.

TekColor installs in the System Folder and launches from the Control Panel. The interface, called TekColor Picker, shows a "leaf" from a "book" of colors that the monitor can display, and overlays the leaf with a boundary line that shows which of those colors the output device can produce. When monitor colors can't be attained by the printer or other device, the software substitutes the closest available color and notifies the user. Variations in human perception of different colors are accounted for in the software, according to Tektronix.

TekColor was scheduled to ship in October at a suggested retail price of $50. It will be bundled with the QuickColor printer. Other third-party bundling arrangements are expected. For more information, call Tektronix in Wilsonville, Oregon, at 800/835-6100.—*Tom Moran*



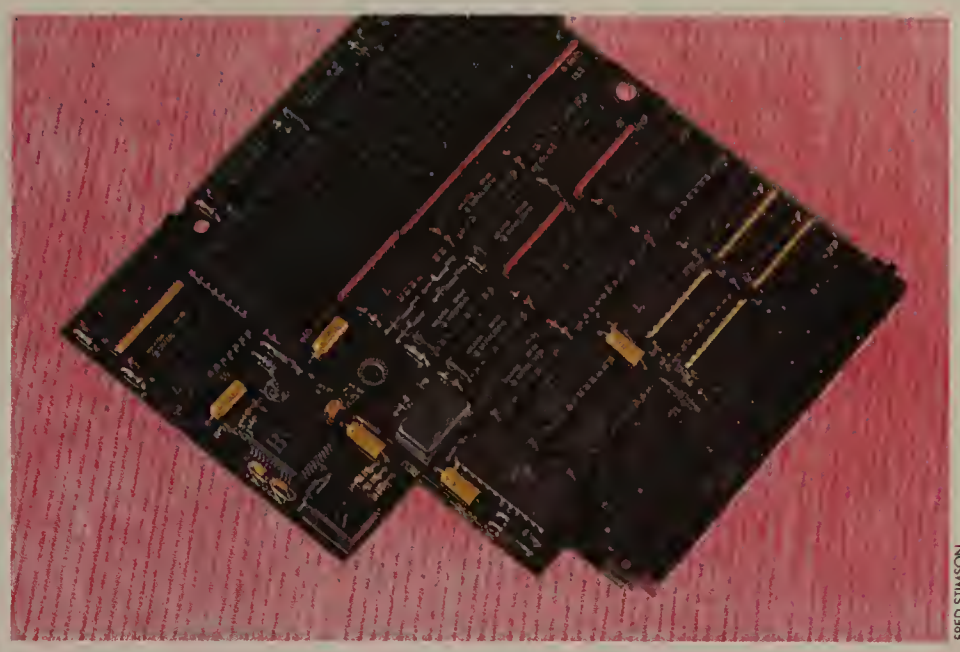
The TekColor Picker DA from Tektronix lets you see the color range of selected printers and monitors, compare them, and choose colors that both printer and monitor can reproduce.

CompuServe Refines Navigational Equipment

Using a traditional terminal emulator to explore CompuServe, with its half-million members, 1000-plus databases, and vast libraries, is like groping along through a labyrinth in a virtual world. Many Mac users who never visit would, if they knew about CompuServe Navigator. Navigator began as homegrown shareware and was picked up by CompuServe to provide a Mac-like shell for finding your way around the peaks (if not all the valleys) of the CompuServe landscape. Navigator version 3.0, which may not be available yet, will have an improved interface and add an integrated address book, accounting capabilities (to keep track of how much time you spend online), and a scroll-back capture buffer like some terminal emulators provide. The new version will not, unfortunately, expand the shell to access airline reservations, the encyclopedia, or other databases; but improvements to the terminal mode and the ability to have multiple terminal tiles and call them from the main script will take some of the pain out of building scripts to automate those more complex functions.

More significantly, version 3.0 eliminates the ASCII-based (text-based) method that CompuServe's mainframes have had to use to communicate with Macs. The new method uses a Host-Micro Interface (HMI) that, in effect, provides the Mac with an understanding of the mainframes' native language. In addition to providing more efficient data transfers and much better error detection and recovery, HMI allows CompuServe's mainframes to upload the CIS interface to a Mac, on the fly, so that changes made on the host don't make software on the Mac obsolete. In addition, CompuServe will license the HMI protocols to third-party developers, making it simple to integrate a CompuServe bridge into electronic mail packages.

Navigator 3.0 will list for $99.95. For more information, contact CompuServe in Columbus, Ohio, at 614/457-8600—*D.L.*



FRED STIMSON

Micron Technology's Xceed series of gray-scale and color graphics boards starts at $595.

Micron Technology Enters Graphics Adapter Fray

Micron Technologies, long the sole U.S. vendor of DRAM chips to the general market, has entered the market for graphics adapters with four color boards, two each for the SE/30 and the Mac II family. Although Micron is already offering RAM add-in boards for Macs and PCs, the new products are its first to go

(continues)

The first PostScript® compatible printer for the Mac to break the $3000 price barrier!
Look familiar? It's based around the popular Eddy Award winning Qume design. Loaded with 3MB RAM, 35 built-in fonts, 6 page/minute RISC technology and a 300dpi liquid crystal shutter, it can out perform Apple's best printers. We bundle it with our Mirror Publisher Pack and back it with a 12 month / 90 day ON-SITE warranty. Why would you buy it from anyone else?

"$1500 less, and they didn't try to sell me a bunch of extra fonts I'll never use!"
—Doug Clapp, Author

Our new "C" series drives are a mass storage and backup/archiving solution in a single cabinet. Industry leading Quantum and Imprimis drive mechanisms are the heart of these systems that race along at speeds to 16ms!
Choose the 42MB removable or 150MB tape for a seamless backup/archiving solution. C40/42: $1497. C80/42: $1897. C100/42: $1997. C170/42: $2597. C170/150: $2597. C290/150: $3397. C580/150: $3997.

The DC600 technology used in our new T150 tape drive can perform backups at 3 times the speed and with 3-1/2 times the capacity of the Apple tape solution—all at a lower price! Our custom backup software allows for automated (unattended) backups, mirror image, file-by-file, incremental or custom backups.

The Right Products

Since 1985 our mission has been to deliver high performance solutions a the very best prices. It all began with the ancestor of this little workhorse, the RM.8, an 800k floppy that reviewers have loved for years. We've continued to improve it and have dropped the price to $147! From that beginning, we've grown to offer four removable technologies, making us the only company that can objectively recommend the right removable for your needs.

There's no excuse for leaving your valuable data unprotected. Our new T150 tape backup combines proven DC600 technology, our easy-to-use sof ware, and an "excuse shattering" low price.

We've joined forces with our Minneapolis neighbor, Imprimis, to introduce three new drives with capacities to 580MB. We chose Imprimis drives for rock solid performance and blistering speeds to 16ms.

We were first to introduce a combination storage/backup solution in 1986. Our new generation "C" series is comprised of seven solutions based around Quantum and Imprimis drives (the slowest being 19ms!) with a choice of 42MB removable or 150MB tape for reliable backup and archivin

Our new MirrorImage printer breaks the $3000 price barrier for PostScript® compatible Macintosh printers!

The Right Prices

"Mirror Technologies has proven again that high performance doesn't have to be priced higher than a kite... Factory direct sales keep the price low."
—MacGuide

Thank you MacGuide! We couldn't have said it better ourselves. We've shown thousands of Macintosh users a better way to buy computer products. Wher you buy direct from Mirror Technologies, you get Factory Direct pricing, our 30 day ***Love-It-or-Return-It*** guarantee, solid warranties and answers direct from the source. (After all, for product information, who better to ask than its maker?) And our momentum lets us continue to drive prices down!

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We've doubled our sales staff, established a 24 hour/ 7 days a week order hotline, and offer Federal Express delivery—all to make sure you never wait. So don't—order right now by calling

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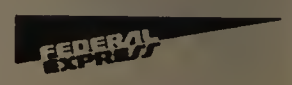
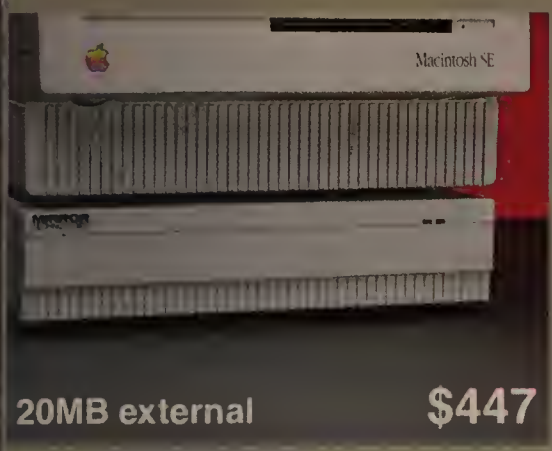


All prices/specifications subject to change without notice. Call for current pricing, warranty, and promotional details. Mirror and MirrorImag



"The cream of the crop...and are also among the least expensive."—*MacWorld*
Sleek, fast, quiet. Our M series hard drives feature an international power supply, external SCSI switching, cables, and whisper quiet fan. Drives ship formatted, tested and loaded with 10MB of utilities and shareware, and are backed with our 2 year limited warranty. Our three newest drives feature high capacities (170,290, 580MB) and speeds to 16ms! M20: $447. M30: $497. MP40: $647. M45: $597. M60: $667. M80: $727. MP80: $997. MP100: $1097. M170: $1897. M290: $2497. M580: $3297. *(MP designates premium 19ms Quantum drives.)*

Our internal drives save you space and money. We've got internal solutions for the Mac SE, SE30, II, and IIcx. SE owners- keep both floppy drives (or one floppy and one hard drive) with our unique mounting system. Drives ship formatted, tested and loaded with 10MB of utilities and shareware, and are backed with our 2 year limited warranty. M20i: $377. M30i: $427. MP40i: $577. M45i: $527. MP80i: $927. MP100i: $1027. *(MP designates premium 19ms Quantum drives.)*

Our VS300 and 200 scanners deliver crisp text, line art, and dithered halftones at a fraction of the cost of most scanners. The clean, elegant design means a compact footprint, fewer moving parts, 3-D capabilities, and no bulbs to replace. The simple to use software saves in all popular formats and operates as a Desk Accessory. We even include DeskPaint for retouching!
"If it were my money, I'd buy the Mirror...its price/performance ratio is unequaled"—*Byte*
AND, for a limited time, we'll also include FREE Optical Character Recognition (OCR) software from Olduvai ($495 Value). VS200 (200dpi): $597. VS300 (300dpi): $797.

The RM20 operates as fast as many hard drives but with the integrity of a floppy. Utilizing disks and technology from Kodak, the shock resistant media is guaranteed for life, making it perfect for archiving and backups.
"...faster [and $100 less] than the Jasmine drive"—*MacUser.*

Built around Eddy award winning Syquest technology, the RM42 is faster than most hard drives.

"The 45MB removables [42MB formatted] were among the fastest backup solutions I tested."
—*MacWorld*
"For convenience, flexibility and speed, the 45MB removable is the clear winner."
—*MacWorld*
Auto head parking, self diagnosis, and a memory cache that allows optimum 1:1 interleaving on all Macs, make the RM42 the right choice. 42MB/42MB (Combo) $1697.

Imagine securing your drive or file server each night by just turning a key and sliding out a hard drive module. Our RD series are removable modules containing our best sealed hard drives, with capacities to 100MB and speeds as fast as 19ms. The obvious choice for high security applications. RD30: $747. RDP40: $897. RDP80: $1247. RDP100: $1347. *(Prices include RC chassis. RDP designates premium 19ms Quantum drives.)*

Our experts fix their drives too. And we usually do it cheaper and faster! Give that expired drive a second life. 20MB: $237. 30MB: $247. 40MB: $277 (SCSI embedded and internals slightly higher). Call our **Technical Support Hotline** for details: 612-633-2105.

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Circle 424 on reader service card

Seagate's ST157 Family

THE FINE ART OF DISC DRIVES

Oil painting by
Francis Livingston
San Anselmo, California

As the storage and retrieval device for valuable information, a disc drive plays a critical role in a personal computer's overall operation. Building hard disc drives that deliver both high performance and high reliability requires the same degree of precision employed by skilled artists.

This precision is reflected in every Seagate ST157 family drive. Using our own stepper motor processes, each drive is auto-tuned for optimum performance every time the drive is powered up.

This 21-49 megabyte 3.5″ drive family is a skillful blend of performance and reliability. With access times of 28 msec, these drives feature an MTBF of 70,000 hours, and are available in SCSI, ST412 and AT® interfaces.

Like the artist who spends years perfecting his craft, Seagate has spent the past decade mastering the fine art of disc drives. For more information on our palette of high quality storage solutions, contact your authorized Seagate distributor, or call Seagate directly at 800-468-DISC, or 408-438-6550.

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outside the realm of pure memory.

The Xceed NB10-78 and Xceed NB6-48 are NuBus cards that offer 1024 by 768 and 640 by 480 resolution, respectively. The Xceed SE/3010-78 and Xceed SE/306-48 are the equivalent products for the SE/30. All operate in 1-, 2-, 4-, and 8-bit mode in gray scale or color, supporting 256 on-screen colors from a palette of 16.7 million. All can support two monitors and come with a gamma color-correction DA and a Micron-developed paint program that can run at 8 bits or 24 bits.

Slated to ship in September, the two 640 by 480 resolution boards will retail at $595, while the two 1024 by 768 boards list for $995. For more information, contact Micron Technology in Boise, Idaho, at 208/386-3900.—*T.M.*

Microsoft Mail: Almost Like Being There

Microsoft Mail 2.0 is an example of the increasing sophistication of electronic mail systems for the Macintosh. The new version, which should be available now, adds integration with other Microsoft packages, gateways to other local and remote electronic mail systems (AppleLink, MCI Mail, IBM's PROFS, a UNIX implementation, and X.400, among others, are available or under development), and through add-on products being developed by Alisa Systems and Pacer, the ability for a VAX to act as a mail server. Microsoft Mail keeps an up-to-date list of user addresses everywhere on a network, enabling transparent access to many names across multiple servers.

RANDALL MICHAELSON

Tronsoft founder Ron Way (left) and Hollywood Vaults president David Wexler on location.

Integrating Microsoft Word with Microsoft Mail is useful, if somewhat obvious. Selecting Send Mail under Word 4.0's File menu brings up the address dialog and then sends the front window off to the addressee. If the receiver happens to be using a PC on an AppleTalk network, the message appears, fully formatted, in the PC version of Word. The integration of Excel and Mail is more impressive. Excel 2.2's macro language has new functions for opening and reading Mail, and Microsoft has been showing an example that uses a custom Excel application and Mail's custom forms capabilities to run an automated office-supplies order system. Line items on an order form are read from Mail into Excel, and a series of macros sends the request to the supply room and updates an inventory database kept on a server. In spite of these features, Mail is still missing some basic capabilities. Only one file can be attached to a message, and users have to appeal to the network administrator to create customized distribution lists. Microsoft plans to correct both of these shortcomings in a later version.

Microsoft Mail is priced at $395 for the server software and $125 per Mac or PC workstation, or $1495 for 20 workstations. For more information, contact Microsoft in Redmond, Washington, at 206/882-8088.—*D.L.*

Not Gone with the Wind

We'd all like to save the world with our Macs, but David Wexler has already done it—at least in the Hollywood film world. Wexler knew that a lot of highly valuable master copies of movies were slowly deteriorating because temperature and humidity were not being controlled in storage. So he set out to build a storage facility that would keep great classics like *City Lights* from fading to black.

Wexler's biggest problem was to convince commercial lenders that the project could make money. He used a pro-

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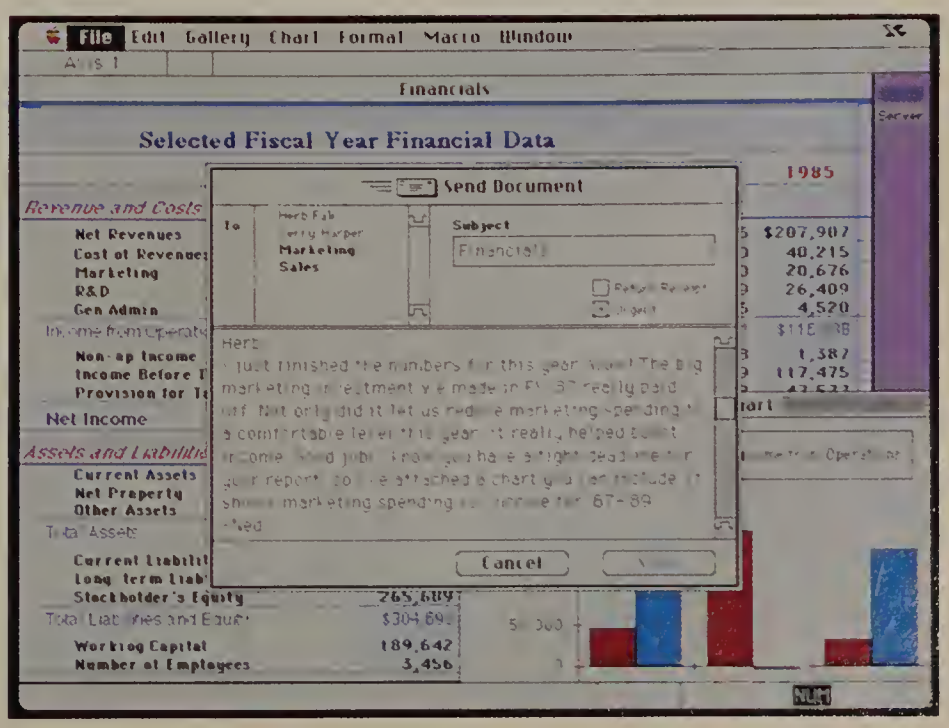

With Microsoft Mail you can send a worksheet from within Excel to another Excel user or even to an Excel application on a server.

This space represents 14MB potential memory now available in your Mac.

And this is all you've got.

14MB? That's right! Now you can break the eight megabyte barrier—without shelling out megabucks for expensive memory chips.

Introducing VIRTUAL 2.0—the advanced virtual memory software for the Macintosh II, IIx, IIcx and SE/30. By putting information normally stored in RAM on your hard disk drive—and retrieving it transparently as required—VIRTUAL allows you to run multiple "memory hogs" concurrently under MultiFinder. And for just $199 (or $545 for the Macintosh II), VIRTUAL not only helps with memory that's too full... it also helps keep your checkbook from getting too empty.

To order call (415) 324-0727 or fax (415) 324-2958.

MEGABYTES NOT MEGABUCKS

Connectix Corporation, 125 Constitution Drive, Menlo Park, CA 94025

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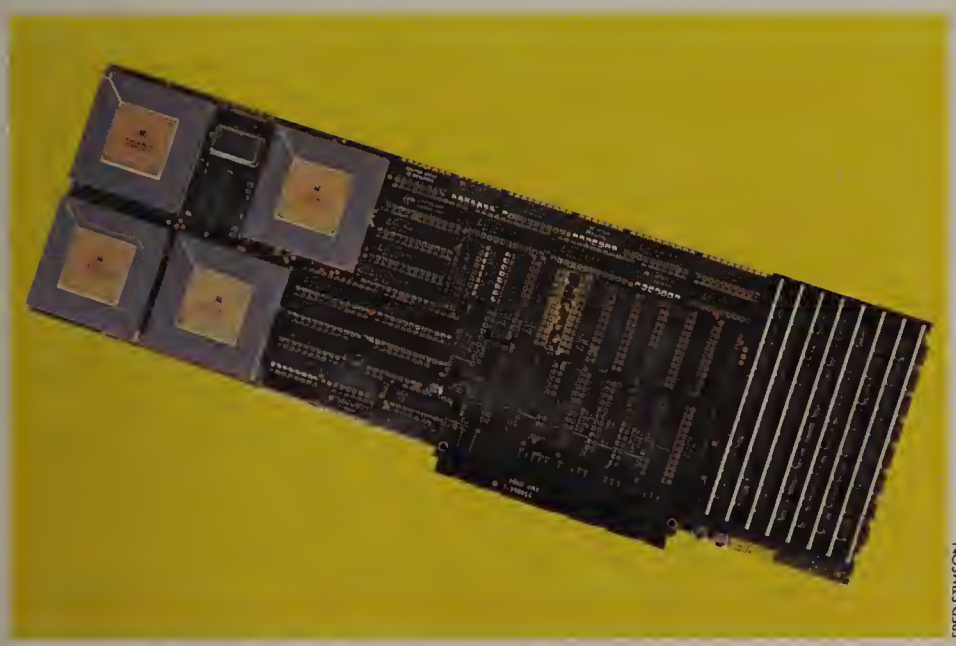

FRED STIMSON

Tektronix's RP88 coprocessor board sports Motorola's 20MHz 8800 RISC chip and runs at 17 MIPS.

gram called Real Estate Master, from Tronsoft of Santa Barbara, California, to help with the complicated financial analysis for a building with temperature and humidity control, fireproofing, and automated storage systems. "[The program] reminded us of the little things that you would be able to overlook when you're working on a project like this," Wexler says. It also allowed him to present the Real Estate Master analysis to commercial lenders as a backup to the business plan.

The software takes into account the type of building, projects ten-year cash flow, and calculates the effects of partnership and syndication. It also projects before-tax and after-tax profits.

Wexler and his colleagues at Hollywood Vaults ended up using the Mac for everything associated with the building: they used MacProject for scheduling, MacPaint for the floor plans, and MacWrite for correspondence. Now the building's interior stays at 55 degrees Fahrenheit and 50 percent humidity, preserving the films, videotapes, and audiotapes that are the mainstay of the archive. The company also stores photos, artwork, and backup media on its automated moving-shelf storage system. And with a full house and a line forming outside below the marquee, the company is hard at work preparing Hollywood Vaults: The Sequel.—*T.M.*

Mac II on Steroids

The first generally shipping 88000-based coprocessor board for the Mac II was recently unveiled by Tektronix. Incorporating Motorola's 88000 RISC processor, the board is designed to accelerate the Mac II's speed by as much as 30 times.

The RP88 coprocessor provides 17 MIPS at 20MHz and includes a built-in math coprocessor that can calculate up to 7 million floating-point operations per second The Finder and the Mac II's keyboard, monitor, and drives are still driven by the 68020 on the system board, while the 88000 performs the intense computations.

Intended for such power-hungry applications as high-end CAD/CAM, molecular modeling, and image processing, the RP88 comes with 2MB of RAM, 32K of cache RAM, and sample programs. Now shipping, the board starts at at $9575. Various programmer's tools are also available. For more information, call Tektronix in Wilsonville, Oregon, at 800/835-9433, ext. 8800.—*T.M.*

PostScript Clone on a Disk

PostScript printing output can look great, but it's not always affordable. That's especially true of color PostScript. Printers such as the QMS ColorScript Model 20 and the Tektronix Phaser CPS produce stunning 300 dpi color output, but both cost $15,995.

A $495 program called Freedom of Press, which should be available now, promises to deliver PostScript-quality output at non-PostScript prices. Freedom of Press essentially uses the Mac's processor and memory to turn a non-PostScript printer into a PostScript clone containing 35 fonts. (Downloadable PostScript fonts from any vendor except Adobe can also be used.) Freedom of Press can drive about 40 output devices, including 24-pin dot matrix printers from Epson, IBM, and Fujitsu; laser

(continues)

PIERRE YVES GOAVEC

Freedom of Press made it possible to print this PostScript art on a non-PostScript CalComp 5613 color thermal printer.

What happens when hitting perfect color becomes a National priority?

Expanded choices, extraordinary support, professional features.

Meet Mac'langelo/24.™ It's the 24-bit color board that puts the power of pinpoint color accuracy on practically any Mac II color screen. Large or small.

In fact, Mac'langelo/24 offers the widest range of compatibility and the most in-depth support for the monitor of your choice.

Support like color-correction tables selected for each monitor. And 72 dpi on 13″, 16″ and 19″ models. Even a five-year warranty.

How about applications compatibility? Mac'langelo/24 runs 32-bit QuickDraw. It lets you switch between 1, 8 and 24 bits per pixel without having to reboot.

And it gives you 100% function-key customization.

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printers from Hewlett-Packard, Tandy, and others; color ink-jet printers from Hewlett-Packard, Howtek, Sharp, and Xerox; color thermal printers from CalComp and Seiko; and even film recorders from Presentation Technologies and LaserGraphics.

To use Freedom of Press, you spool a PostScript file to disk instead of to a printer, and then start Freedom of Press and tell it to interpret the disk file. Freedom of Press uses the Mac's memory and processor to interpret the PostScript code and control the printer, wherein lies the rub: Freedom of Press requires a Mac SE/30 or II with 2MB of memory, and because Freedom of Press runs on the Mac, you can't share it or the printer it controls over a network.

But these limitations may be worth the money you can save. Freedom of Press isn't as convenient as a networked PostScript printer, but non-PostScript printers and film recorders often cost 30 to 50 percent less than their PostScript counterparts. For further information, contact Custom Applications in Billerica, Massachusetts, at 508/667-8585.
—*Jim Heid*

Mitsubishi Introduces 37-Inch Monitor, 24-Bit Color Printers

Mitsubishi Electronics America has introduced a continuous-tone, 24-bit color printer designed for creating near-photographic-quality color proofs for applications including color electronic publishing. The Mitsubishi S340-10 uses sublimable-dye-thermal transfer technology to place dots of transparent color one on top of another, thereby producing up to 16.7 million different colors without dithering. Dithering, a technique of alternating dots of two colors to get a color that's between the two, can reduce apparent resolution.

KEN CHEN

Mitsubishi's 37-inch diagonal color monitor for the Mac II accepts a variety of video formats.

The number of actual colors produced by the 5340-10 will vary with the software and hardware controller used, Mitsubishi said. The company is working with third-party vendors to provide PostScript compatibility through a PostScript interpreter.

The printer completes an A-size color image in about 1 minute and 40 seconds at a resolution of 150 dpi. It can also produce legal-size pages. The S340-10 is shipping now at a suggested retail price of $13,995, including 6MB of RAM. Mitsubishi also announced a color thermal-transfer printer, the G370-10, which attaches to Mac IIs via a parallel interface board. The 300-dpi G370-10, which uses the dithering technique, produces letter, legal, and A4-size output. Also available now, its suggested retail price is $5995.

The company also has a 37-inch color monitor (with 35-inch viewing area) that can accept a wide variety of video formats, including PAL; SECAM and the U.S. standard, NTSC. Intended for presentations and multimedia, the XC-3715C monitor also accepts composite video, Super-VHS, RGB, and TTL input. Compatible with Mac IIs and IBM PCs, the monitor is available at a suggested retail price of $7599. For more information, call Mitsubishi in Torrance, California, at 213/515-3993.
—*T.M.*

We Now Return You to the Program Already in Progress

For those who are tired of waiting for their SE to boot, or afraid of losing data in a blackout; Checkmate Technology is bringing out MacSaver, an internal battery back-up device. MacSaver lets you literally unplug an SE while it's on, plug it in hours later, and be right back in the same application or document. A small amount of static RAM on the MacSaver board stores the state of the microprocessor and other devices, and the battery

(continues)

KEN CHEN

Mitsubishi's S340-10 printer uses sublimable-dye thermal-transfer technology to produce continuous-tone 24-bit color.

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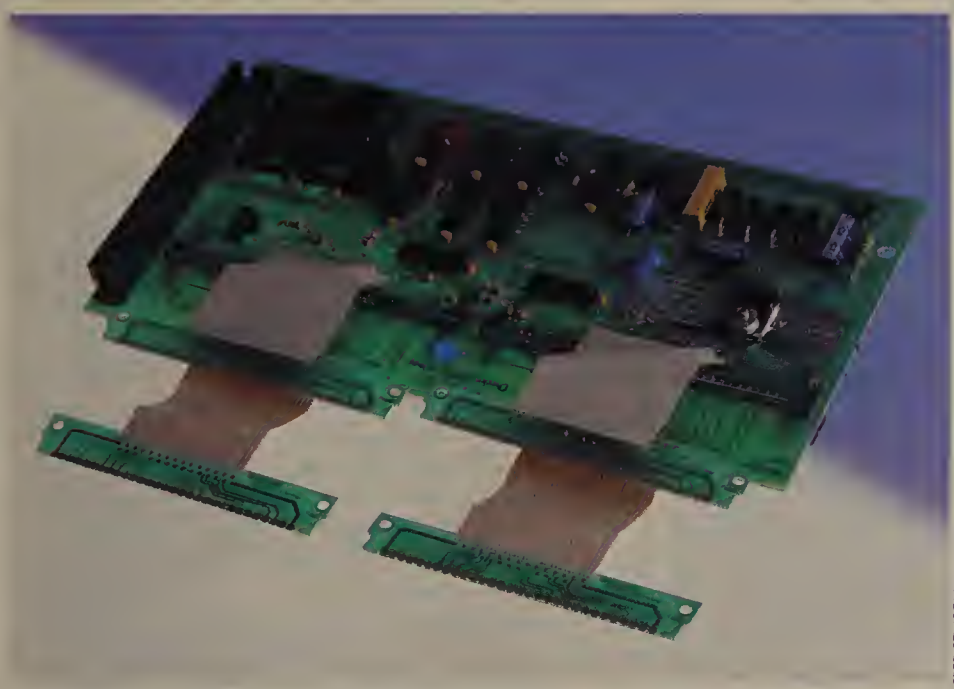


FRED STIMSON

MacSaver, an internal battery back-up device from Checkmate Technology, connects to the SIMM slots on an SE's system board.

power preserves the data and programs in the SE's relocated system RAM. Because MacSaver does not power the disk drive, the company cautions that if the power fails during a write to disk, some data may be permanently lost.

To install the device, you take the system memory out, plug it into the MacSaver board, and then plug MacSaver's cables into the emptied SIMM slots on the system board. An accompanying desk accessory allows you to set a password so that others cannot simply turn the SE on and see your most recent work. The DA also gives you the option of selecting a short delay period so the hard disk drive read/write head can park on power-down.

At press time, Checkmate Technology planned to ship MacSaver in September but had not yet determined if the standard battery would support 12 or 24 hours of backup. MacSaver is expected to retail for $399. For more information, contact Checkmate Technology in Tempe, Arizona, at 800/325-7347. —*T.M.*

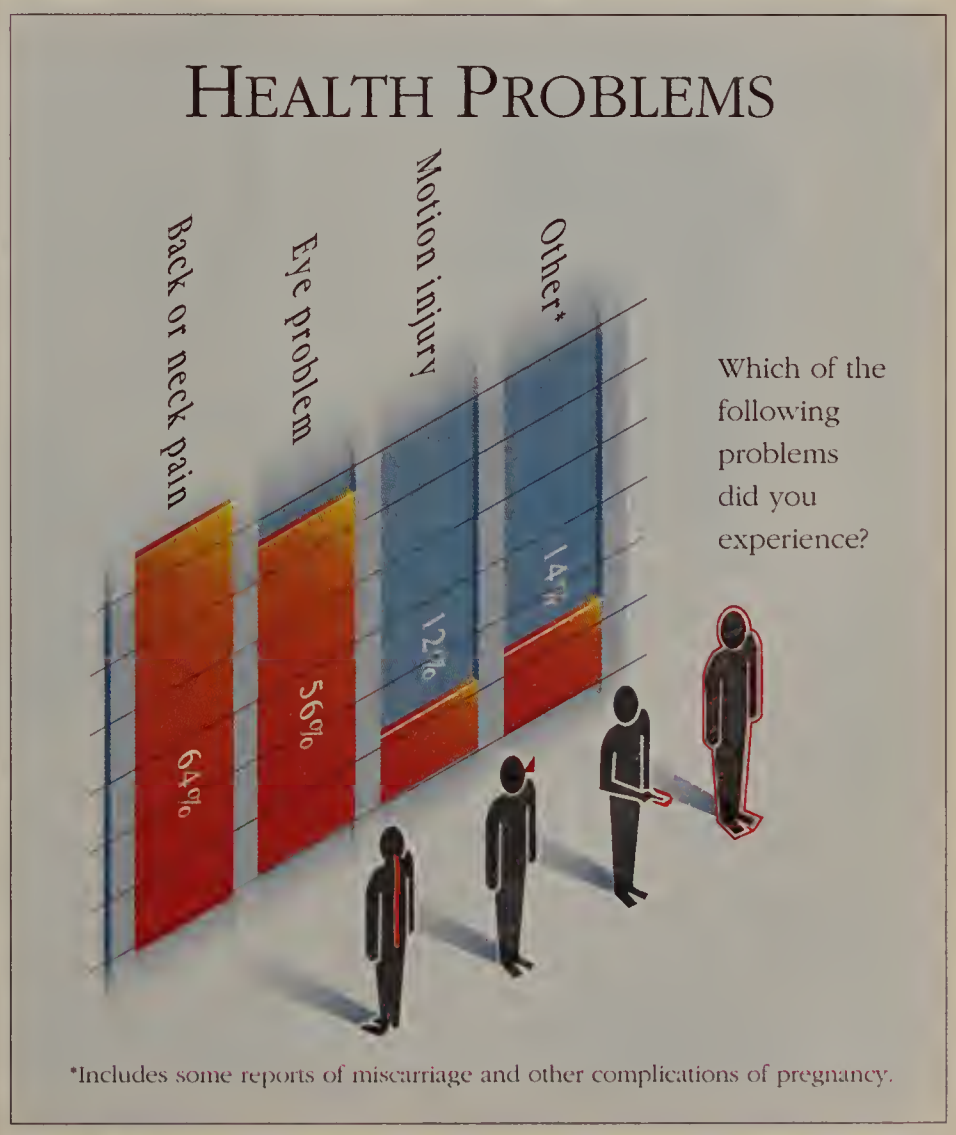
Reader Survey: Computer-Related Health Problems

With carpal tunnel syndrome and other repetitive strain injuries being reported more frequently among office workers, and with new studies indicating that magnetic and electrical fields around electronic equipment may cause illness, concern is growing about the safety of personal computers. Perhaps in part because the United States has no real equivalent of the strict European ergonomic standards for workstations and office furniture, some experts believe that in the next ten years an enormous legal battle will be fought over whether it will be manufacturers, employers, or employees who will bear the cost of these work-related injuries. Our reader survey this month reveals that a significant fraction of readers feel they have sustained computer-related damage to their health.

Thirty-two percent of responding readers who use personal computers reported health problems that they believed were caused by computer use. Of those who had health problems, 64 percent experienced back or neck pain, 56 percent said they had eye trouble, and 12 percent said they had sustained strain injuries from repetitive motions. Miscarriages and other pregnancy complications were also reported among readers who responded.

However, 73 percent of readers with health problems said they had not missed any work days, 13 percent said they had lost less than a day, and 8 percent said they had missed one or two days of work. One percent said they had missed a week to a month, and 1 percent reported being out more than a month.

Only 18 percent of personal computer–using respondents said that their employers have a policy of helping employees with ergonomic problems. However, 40 percent of respondents said that their employer makes ergonomic furniture available. Of those readers, 72 percent said their employer provides ergonomic chairs, 65 percent said monitor tilt-and-swivel stands or suspension devices were available, 57 percent said type stands, 44 percent said monitor shields, 34 percent said keyboard supports, and 21 percent said their employer offers replacement input devices for a mouse.— *T. M.*



Of the responding readers who said they had computer-related conditions, 64 percent reported neck or back problems, 56 percent cited eye trouble, and 12 percent had repetitive motion injuries.

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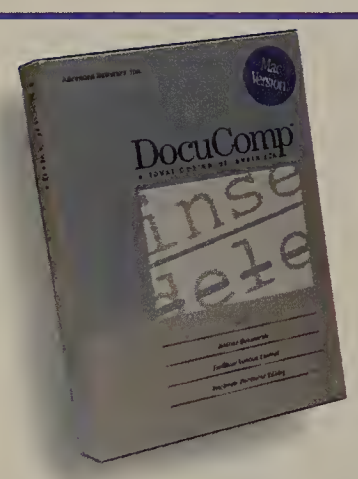

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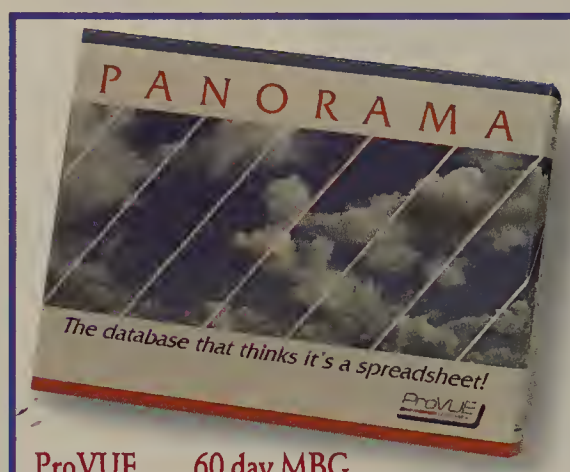

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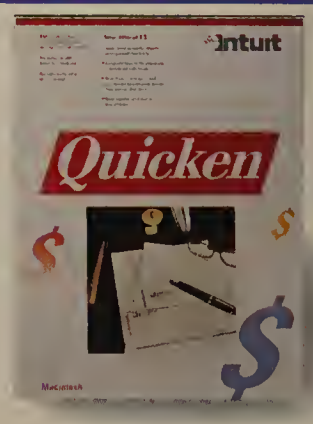

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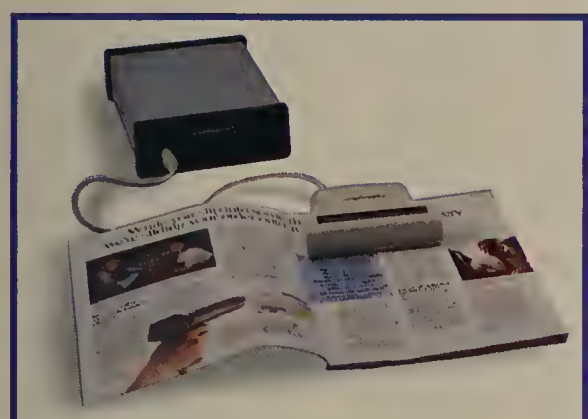

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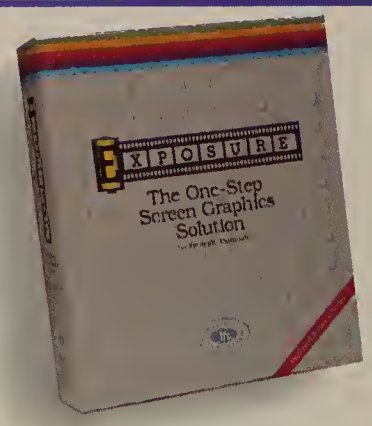

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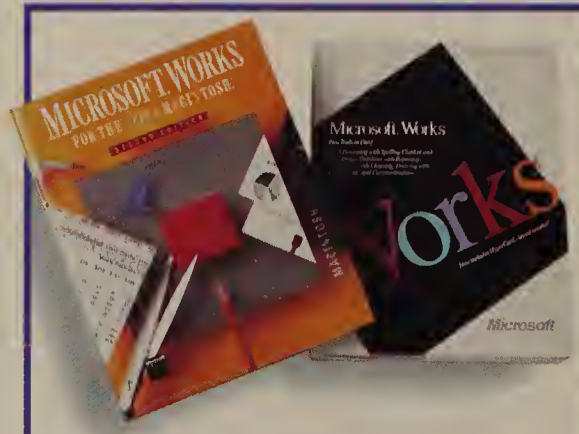

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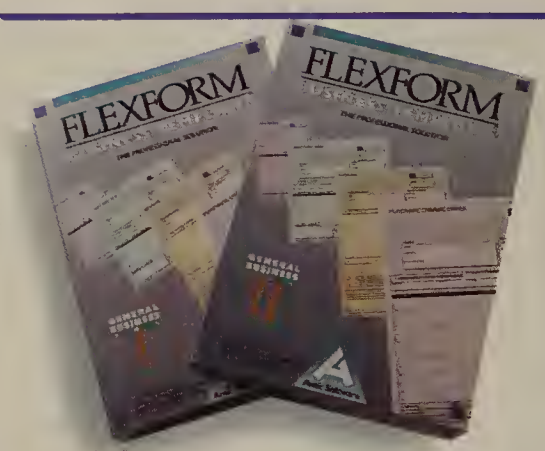

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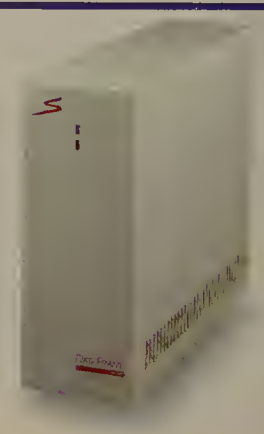

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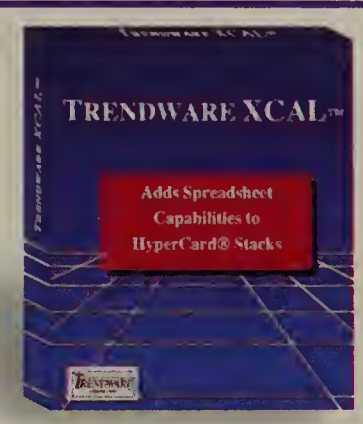

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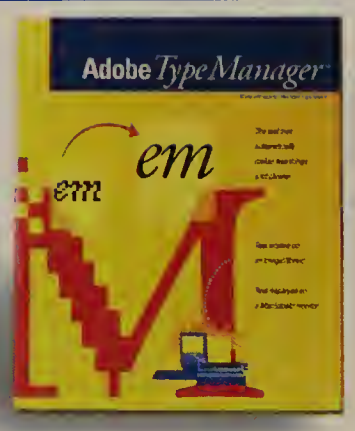

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3397 Leisure Suit Larry *(CP)* . . . . . 23.
3394 King's Quest *(CP)* . . . . . 29.
3395 King's Quest II *(CP)*. . . . . 29.
3396 King's Quest III *(CP)* . . . . . 29.
3398 Police Quest *(CP)* . . . . . 29.
3399 Space Quest *(CP)* . . . . . 29.
3400 Space Quest II *(CP)* . . . . . 29.
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3501 Apache Strike. . . . . 32.
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3347 Mac Wizardry *(CP)* . . . . . 35.
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4071 Mac•Man. . . . . 23.
4072 The Solitaire DA . . . . . 23.
4995 Cribbage Tutor . . . . . 26.
4073 Colour Billiards. . . . . 38.
★Spectrum Holobyte ... 30 day MBG
4175 Solitaire Royale *(for Mac SE)* . . . . . 19.
4001 Solitaire Royale *(for Mac II)* . . . . . 19.
3464 Tetris. . . . . 20.
4472 Tetris *(color version)* . . . . . 24.
3462 PT-109 . . . . . 26.
3460 GATO . . . . . 26.
3459 Falcon 2.0. . . . . 31.
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2328 Sargon IV *(CP)* . . . . . 29.
★Springboard ... 30 day MBG
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★CE Software ... 60 day MBG
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5638 In/Out *(10 user Pak)*. . . . . 189.
5174 QuickMail *(5 user Pak)* . . . . . $175.
5173 QuickMail *(10 user Pak)*. . . . . 259.
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1673 CompuServe Navigator 2.1 . . . . . 45.
1674 Standard Service/Navigator Bundle 59.
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★DataViz ... 60 day MBG
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4842 MacLink Plus/Translators 4.0. . . . . 109.
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4938 FastNet SE . . . . . 375.
5624 FastNet SE30 . . . . . 375.
4937 FastNet SCSI . . . . . 749.
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5295 News/Retrieval Membership Pack. 24.
1785 Desktop Express 1.03 . . . . . 95.
★Farallon Computing ... 30 day MBG
5707 Timbuktu 3.0 . . . . . 99.
4866 Timbuktu Remote 1.0.1. . . . . 195.
4867 Timbuktu 30-Pack 2.0.1 . . . . . 1325.
2201 TrafficWatch 1.08. . . . . 135.

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5664 PhoneNET StarConnector . . . . . 21.
2203 PhoneNET PLUS *(DIN-8)* . . . . . 35.
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5251 PhoneNET CheckNET . . . . . 65.
4869 PhoneNET Connector 10-Pack . . . 215.
4868 PhoneNET Repeater . . . . . 325.
2206 PhoneNET StarController . . . . . 1095.
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5455 Star Wiring Kit *(Harmonica)*. . . . . 65.
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Hayes
2300 Smartcom II 3.1 . . . . . 88.
2307 Smartmodem 2400. . . . . 429.
5169 2400M *(internal w/Smartcom II)* . . 459.
Insignia Solutions
4089 SoftPC 1.3 . . . . . 249.
Intel Corporation
5119 2400 Baud External Modem . . . . . 179.
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4984 Acknowledge 1.0. . . . . *special* 289.
★Microsoft ... 30 day MBG
2875 Microsoft Mail 1.37 (1-4 users). . . . 195.
2872 Microsoft Mail 1.37 (5-10 users). . $325.
2873 Microsoft Mail 1.37 (11-20 users). . 489.
2874 Microsoft Mail 1.37 (21-32 users). . 625.
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3001 TurboNet ST *(DB-9)*. . . . . 30.
5277 TurboBridge . . . . . 359.
★Practical Peripherals ... 30 day MBG
3100 1200 Baud External Modem . . . . . 77.
3102 2400 Baud External Modem . . . . . 179.
5285 PM 2400SA MNP Modem . . . . . 209.
3089 Mac Communications Pack 1.5 . . 225.
★Shiva ... 30 day MBG
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4347 NetBridge. . . . . 339.
4942 TeleBridge . . . . . 339.
3443 NetModem V2400 . . . . . 439.
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3454 MicroPhone 1.5. . . . . 115.
3455 MicroPhone II 3.0 . . . . . 219.
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★Synergy ... 30 day MBG
3130 VersaTerm 4.0. . . . . 89.
3131 VersaTerm-PRO 3.0. . . . . 175.
★TOPS ... 30 day MBG
4188 TOPS Teleconnector *(DIN-8)* . . . . . 29.
4189 TOPS Teleconnector *(DB-9)*. . . . . 29.
3726 TOPS for DOS 2.1 . . . . . 115.
4598 TOPS FlashBox. . . . . 125.
3725 TOPS Repeater. . . . . 129.
3723 TOPS Mac 2.1. . . . . 145.
3720 TOPS Flashcard . . . . . 159.
3724 NetPrint 2.0. . . . . 119.
4714 InBox Starter Kit 2.2 . . . . . 149.
4715 InBox Connection Mac 2.2 . . . . . 49.
★Traveling Software ... 60 day MBG
3729 LAP-LINK Mac 2.0 . . . . . 83.

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4476 OmniPage 2.0 . . . . . 555.
5607 OmniPage/Dove MSE5 Bundle. . 1779.
★Cutting Edge ... 30 day MBG
3988 CE 105ADB Keyboard w/QuicKeys . 135.
★Datadesk ... 30 day MBG
1818 HyperDialer . . . . . 24.

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2593 MacVision 2.0 . . . . . 219.

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1211 LYNX Trackball . . . . . 65.
1212 LYNX Trackball ADB . . . . . 65.

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5018 WristMac Executive 1.0 . . . . . 199.

★Mobius Technologies ... 60 day MBG
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2809 A+ Mouse ADB . . . . . 83.

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2994 15″ Monitor for Mac SE . . . . . 999.
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4097 19″ Monitor for Mac II . . . . . 1195.

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3034 Read-It! OCR 2.1 . . . . . 249.

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3036 Grappler C/Mac/GS 2.0 . . . . . 79.
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5736 44 Meg Removable Cartridge . . . . 119.

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1801 SCSI Interface/Port . . . . . 109.
5103 Mac II Power Pack *(includes Marathon 030 32MHz Accelerator, four 1 Meg SIMMs, and RamSnap)* . . . . . 1799.
1807 MacSnap 524E . . . . . 189.
1809 MacSnap 524S . . . . . 239.
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1812 MacSnap 548S . . . . . 479.
1800 MacSnap 2SE . . . . . 319.
1797 MacSnap Plus 2 . . . . . 319.
1804 MacSnap 2S . . . . . 279.
1805 MacSnap 4S . . . . . 549.

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1793 MaraThon 020 MSE1 . . . . . 429.
1794 MaraThon 020 MSE2 *(1 Meg)* . . . . . 719.
1795 MaraThon 020 MSE3 *(math chip)* . . 599.
1796 MaraThon 020 MSE4 *(1 Meg/chip)* . 899.
5192 MaraThon 020 MSE5 *(4 Meg)* . . . . 1269.
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4663 MaraThon 030 Accelerator 32 MHz . 969.
5623 MaraThon Racer . . . . . 149.

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5391 FastNet LAN 1 . . . . . 1125.
5390 FastNet LAN 2 *(1 Meg)* . . . . . 1499.
5389 FastNet LAN 3 *(math chip)* . . . . . 1349.

Dove Computer ... 60 day MBG
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5388 FastNet LAN 4 *(1 Meg/chip)* . . . $1724.
5387 FastNet LAN 5 *(4 Meg)* . . . . . 2175.
5386 FastNet LAN 6 *(4 Meg/chip)* . . . . 2399.

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5132 40 Meg Raw Drive *(25ms)* . . . . . 436.
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IOMEGA
5552 44M Ext. Single Bernoulli II Drive. 1399.
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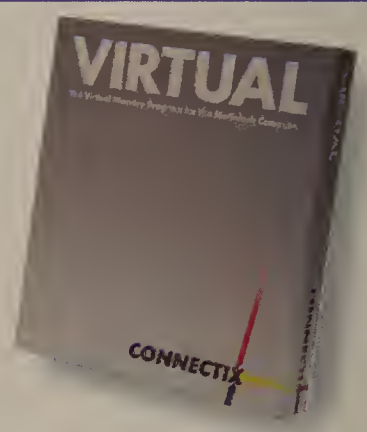

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3297 **Sony** 3½″ DS/DD Disks . . . . . 15.
2792 **MAXELL** 3½″ DS/DD Disks . . . . . 16.

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2793 **MAXELL** 3½″ HD Disks *(1.44 Meg)* 32.

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3943 **3M** DC2000 . . . . . .21.
3944 **3M** DC600A . . . . . .29.

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Apple Computer
1113 Black ImageWriter Ribbon . . . . . 10.

★Avery ... 60 day MBG
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★Basic Needs ... 60 day MBG

5635 Keyboard Flip . . . . . 8.
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5634 Large Screen Monitor Stand . . . . . 39.

★Computer Coverup ... 60 day MBG

1722 ImageWriter LQ Cover . . . . . 8.
1723 ImageWriter II Cover . . . . . 8.
1720 Mac Plus Cover . . . . . 10.
1724 Mac SE Cover . . . . . 10.
1725 Mac SE Ext. Keyboard Cover Set . . 10.
4657 LaserWriter II Cover . . . . . 10.

★Goldstein & Blair ... 30 day MBG

2267 *The Macintosh Bible* (2nd Edition) . . 20.

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2379 MacLuggage Imageware II . . . . . 49.
2376 MacLuggage Macinware Plus . . . . 64.
2381 MacLuggage Macinware SE . . . . . 75.

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2531 Teakwood Roll-top Case *(holds 45 disks)* 14.
2532 Teakwood Roll-top Case *(holds 90 disks)* 21.
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MacConnection carries the entire line of Kensington's accessories. Partial listing below.

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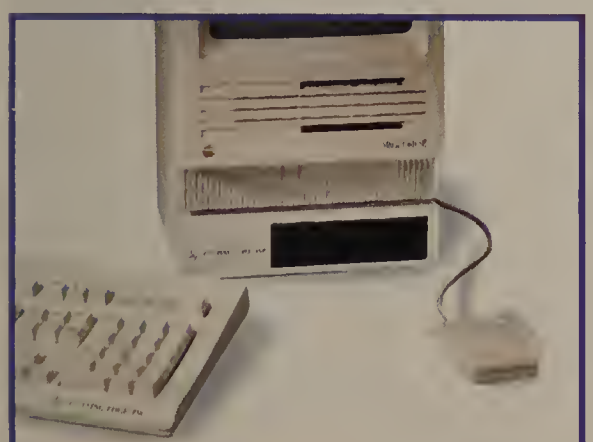
2563 Mouse Pocket ADB . . . . . 8.
2569 Mac Plus/SE w/System Saver Cover . 9.
2558 ImageWriter II Dust Cover . . . . . 9.
2589 Universal Printer Stand . . . . . 15.
4970 Modem/FAX Protector 10 . . . . . 15.
4971 Modem/FAX Protector 20 . . . . . 25.
4126 LaserWriter II Dust Cover . . . . . 17.
2580 Mac II Stand . . . . . 20.
2545 Universal Copy Stand . . . . . 22.
2573 Tilt/Swivel *(platinum)* . . . . . 22.
2578 Extra Long ADB Keyboard Cable . . 25.
2579 Mac II Monitor Cable Extension Kit . 33.
4972 Power Tree 10 . . . . . 19.



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2559 Apple Security Kit . . . . . 34.
2568 Maccessories SuperBase . . . . . 34.
2585 Printer Muffler 80 . . . . . 43.
2586 Printer Muffler 80 Stand . . . . . 24.
4070 System Saver SE . . . . . 52.
2566 System Saver Mac *(platinum)* . . . . . 64.
2567 System Saver Mac *(beige)* . . . . . 64.
2546 A-B Box *(DIN-8)* . . . . . 64.
2556 Maccessories Anti-Glare Filter SE . . 33.
5064 Apple Color Monitor Polarizing Filter 65.
5065 Full Page Display Polarizing Filter . . 65.
5066 Two Page Display Polarizing Filter . 135.
4941 Mac II Monitor Stand . . . . . 65.
4643 Mac II Stand and Cable Kit . . . . . 65.
2561 MasterPiece Mac II . . . . . 105.
5229 PowerBacker 330 . . . . . 269.
5577 PowerBacker 450 . . . . . 339.
5578 PowerBacker 520 . . . . . 399.
5230 PowerBacker 800 . . . . . 749.
5228 PowerBacker 1200 . . . . . 949.

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2693 Moustrak Pad L/F *(9" x 11")* . . . . . 10.

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5622 Shield for Mac II *(*2523F)* . . . . . 99.

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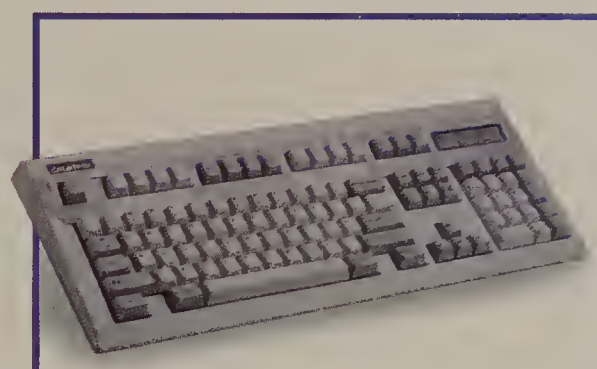
3270 ImageWriter II Rainbow Six Pack . . . 20.
3260 ImageWriter LQ Black Ribbon . . . . . 17.
4011 ImageWriter LQ 4-Color Ribbon . . . 20.

★Sopris Softworks ... 60 day MBG

4171 Mac SE Std. Keyboard Cover *(navy)* . . 15.
4019 Mac SE & Ext. Keyboard Cover *(navy)* . 15.
4017 ImageWriter II Cover *(navy)* . . . . . 11.



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4014 High Trek Mac SE & Ext. Kybd. Case . 69.
4861 SE Protection Pak *(std. keyboard)* . . 65.
4862 SE Protection Pak *(ext. keyboard)* . . 75.

★Targus ... 60 day MBG

3618 ImageWriter II Carry Case . . . . . 49.
3617 Mac Plus/SE Carry Case . . . . . 59.
4015 Mac SE & Ext. Kybd. Carry Case . . 69.

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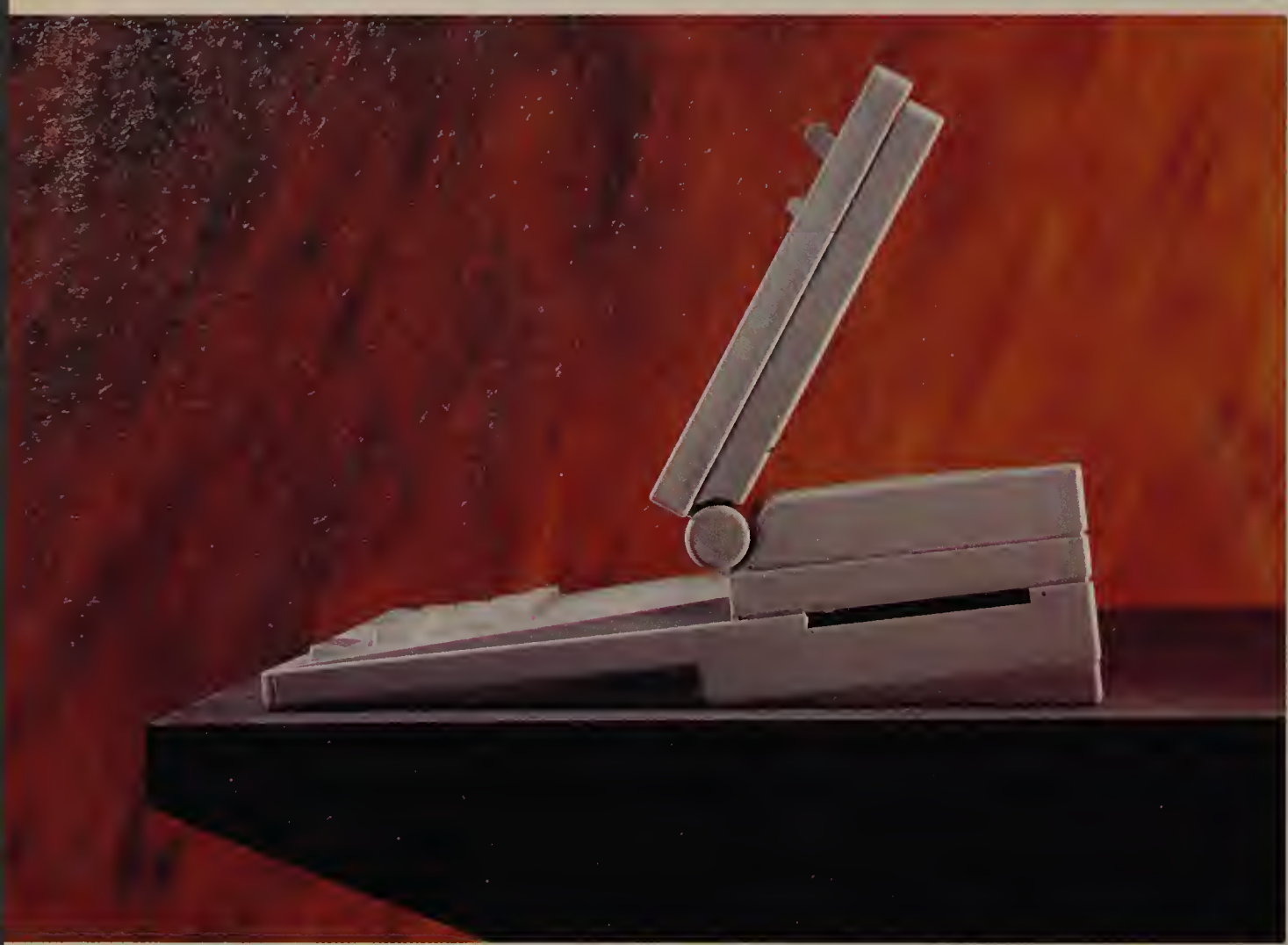
THE MACINTOSH PORTABLE

Apple's new portable is moving in the right direction, but has it arrived?

BY BRUCE F. WEBSTER

Portability has always been a key aspect of the Macintosh's personality. With its small footprint and narrow face, the original Mac proudly asserted the virtues of a compact and space-efficient design. Ironically, since then Macintoshes have marched off in the opposite direction—getting bigger, heavier, and wider while users continued to dream of smaller, more compact versions. The only exception to this trend has been the Mac IIcx (which may partially explain its tremendous popularity). Needless to say, most of us have been waiting to see what Apple would come up with when it did finally unveil the portable

PHOTOGRAPHS BY MARK JOHANN



Profile of a Portable
The wedgelike shape of the Portable changes when you lift the screen into viewing position. Floppy disks go into the opening on the right side.

So much innovation and new technology went into the Macintosh Portable that it can't be dismissed out of hand

Macintosh. Here's a report based on a sneak preview I attended at Apple Computer during the summer.

If you have been anticipating the ultimate portable you may be disappointed. There's good news and bad news. Let's get the bad news out of the way first, though it will come back from time to time. Here it is: the Macintosh Portable is not a laptop powerhouse for the rest of us. The Portable is too big (roughly 15 by 15 inches, and 4 inches high in the back) and too heavy (just under 16 pounds) to be called anything but a transportable or, to borrow a friend's favorite phrase, a luggable. Priced around $6500–$7000, it's too expensive to be a second Mac for most folks. It's also too underpowered to justify that price for a one-and-only. In today's paper I saw an ad offering a Mac SE/30 for half that price.

And yet so much innovation and new technology went into the Macintosh Portable that it can't be dismissed out of hand. It certainly isn't a failure; on the contrary, in terms of the design goal—a portable, battery-powered Macintosh—it's a smashing success. The screen (an active matrix liquid crystal display) is probably the finest on a laptop, short of a volt-sucking plasma screen. Power management appears to be raised to a new art. Apple claims 6 to 10 hours of normal use, including hard disk access, before recharging the battery, and up to 15 hours if you avoid the hard disk altogether.

On the Outside Looking In

Closed up, the Macintosh Portable looks a bit like a fourth-generation Apple IIc. The portable is platinum-white, has a slotted plastic case that is wedge shaped: thick at the back, growing thinner toward the front. Along the back are the ports (see "The Portable's Ports"). All are standard Macintosh inlets and outlets, including

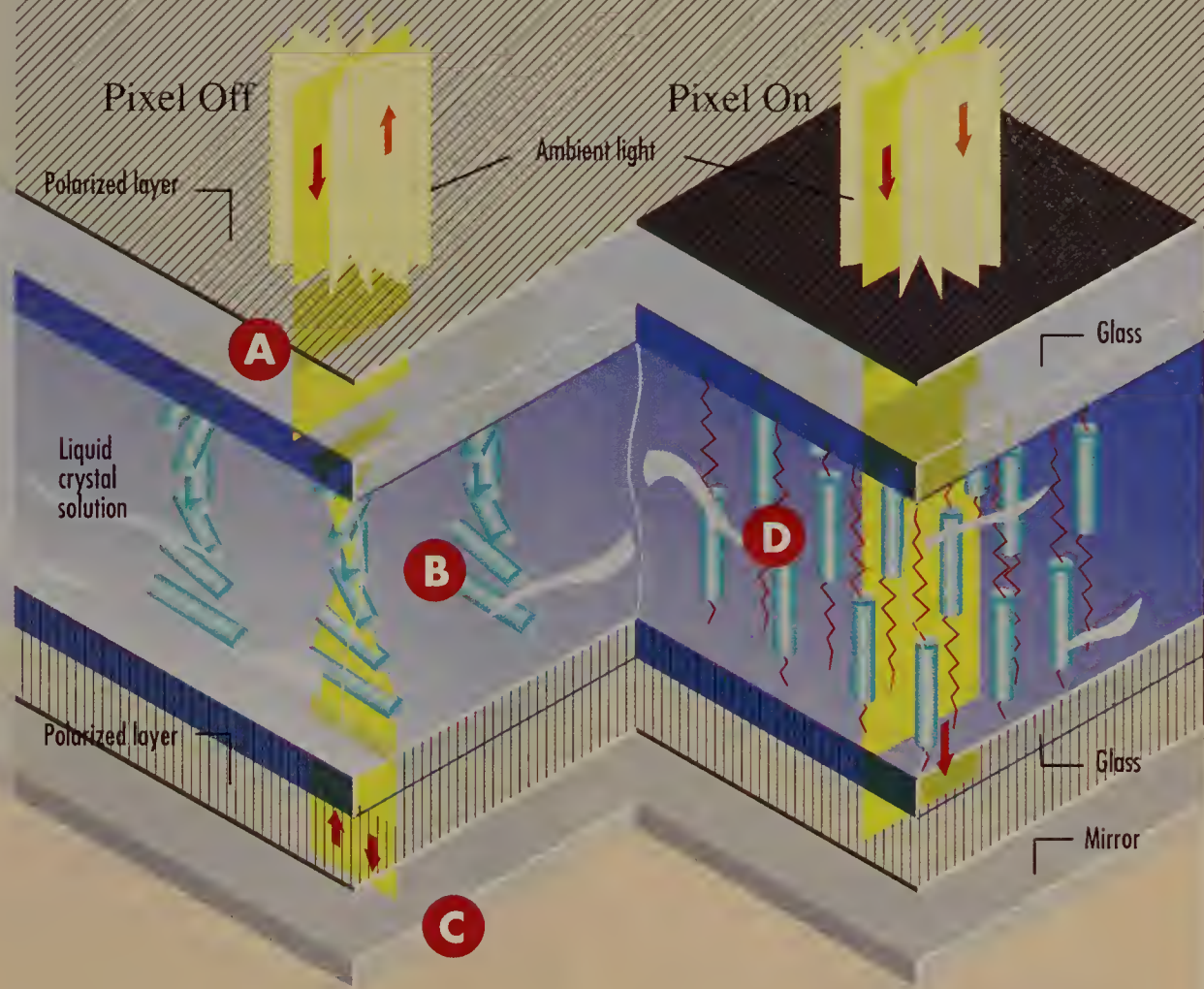
- A port for a second external floppy drive
- a SCSI port (DB-25 connector) for external devices (hard disks, for example)
- an Apple Desktop Bus (ADB) port for a mouse or other ADB device
- a port for stereo audio output
- the power inlet, where the power adapter plugs in
- two standard Mac serial ports (DIN-8 round connectors)
- a video output port, capable (with separately sold external adapters) of producing standard Macintosh or NTSC output

It has a half-height SuperDrive floppy disk drive on the right side toward the back. A second internal disk drive is a possibility, provided you don't opt for the 40MB hard disk. Also, a port in the back lets you connect an external SuperDrive.

The standard mass storage is a 40MB 3½-inch hard disk. According to Apple, this hard disk is very rugged, a claim that was put to the test when one of the prototype Portables, zipped up in its carrying case, fell off a table and onto the floor. The Portable was removed from its carrying case and found to be working just fine. The people at Apple didn't know if the hard disk would be standard or op-

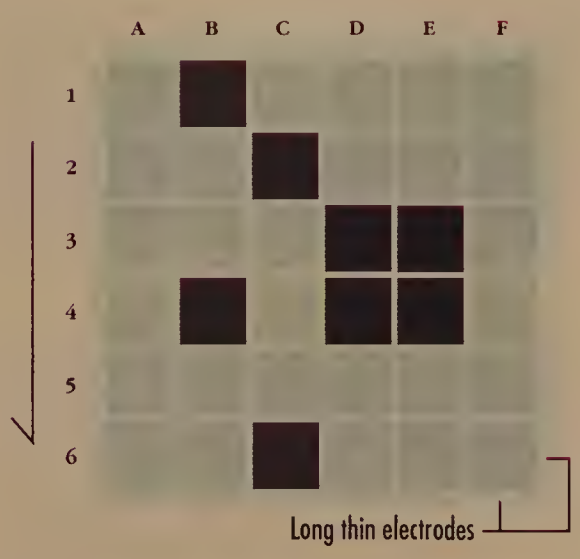
How the Active Matrix LCD Works

Active matrix LCDs and conventional LCDs rely on the same basic technology. The image to the right shows how an LCD creates a white (off) pixel or a black (on) pixel. Ambient light passes through a layer of polarized glass **(A)** into a liquid crystal solution. Uncharged crystals form a natural helix that twists at a 90-degree angle **(B)**. This twist redirects incoming light so that it passes through a second polarized layer and reflects off the mirrored bottom layer **(C)**. The reflected light makes the pixel look white. When an electric charge is applied to the crystals, it forces them to straighten out of the helix formation **(D)**. The straightened crystals no longer change the angle of the light, so the second polarized layer now acts as a barrier that prevents light from reaching the reflective surface; without the reflected light, the pixel looks black.

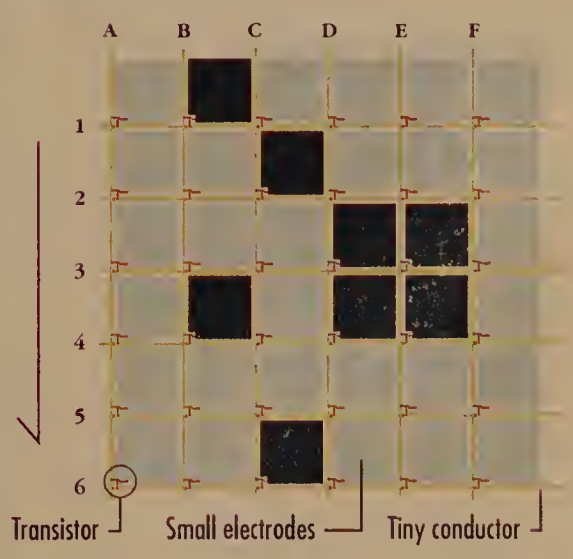


LCDs control specific pixels by using a grid of horizontal and vertical electrodes. An evenly timed charge cycles along the horizontal electrodes. Specific pixels are activated when precisely timed vertical charges concur with the horizontal charge. This scheme provides good contrast and quick response. However, as the charge moves on, the crystals resume the helix configuration, turning the pixel off. In SuperTwist technology the crystals twist up to 270 degrees. This gives the crystals the power to stay dark longer (because it takes longer to form a more twisted helix), but does so at the expense of contrast and responsiveness. The active matrix LCD used in the Mac Portable solves the problems of conventional LCDs. The active matrix screen provides high contrast and responsiveness by using a 90-degree twist. But instead of electrodes, an active matrix LCD uses a tiny conductive wire to carry the charge to each pixel. At each pixel, a small transistor retains the charge after the cycle moves on so that the crystals stay in place.–*Arne Hurty and Adrian Mello*

SuperTwist screen detail



Active Matrix screen detail



The Portable's Ports
The Macintosh Portable has a standard set of ports plus a few special-purpose ports. From left to right: video, floppy-disk-drive, SCSI, modem (middle), ADB, printer, phone, sound, and power-recharging ports.

Most LCDs are hard to read, slow to update, have limited viewing angles, and are very sensitive to ambient light

tional and how that would affect pricing.

The Macintosh Portable has a built-in carrying handle, although every unit does ship inside its own carrying case (see "Have Mac, Will Travel").

To open the Macintosh Portable, you push the handle into the case and lift up. The top of the front half of the case raises up, revealing a keyboard in the bottom and a screen in the top.

Activating a Screen Revolution

The screen is one of the great breakthroughs of the Macintosh Portable, especially when you compare it to the various LCD displays used on other portable computers. Most LCDs are hard to read, slow to update, have limited viewing angles, and are very sensitive to ambient light. As the owner of a Z-181 laptop from Zenith, which has a supertwist backlit LCD screen, I know how much positioning and fiddling with brightness and contrast controls is often necessary to get a legible display.

In comparison, the active matrix LCD used in the Portable is crisp and sharp, with high resolution (77 dpi). The display has a wide viewing angle; you can read it even when the machine is positioned at an oblique angle. Since the display is reflective instead of backlit, you need a certain minimum amount of ambient light to read it. But that amount is fairly low—you can still read the display in a dimly lit room—and the screen becomes more (not less) legible in bright light.

According to Apple, the differences between the active matrix LCD and regular LCD screens are due to high contrast (the Macintosh Portable's contrast is up to five times greater than other LCD screens) and an individual transistor associated with each pixel on the screen (see "How the Active Matrix LCD Works"). These transistors are spread out on an integrated substrate applied directly to the back of the screen; one Apple engineer jokingly dubbed it GSI, for gigantic scale integration.This approach accounts for the fast switching time for each pixel. It also accounts in part for the high cost of the Portable because of challenges in design, manufacturing, and yield.

The Macintosh Portable screen is monochrome (1 bit per pixel, no gray shades) and is 640 pixels wide and 400 lines high. This screen shares the same width but is shorter than the 640-by-480-pixel displays generated by the Apple video boards in the Mac II, IIx, IIcx, and IIci. It's noticeably larger than the standard 512 by 342 displays on the Mac Plus, Mac SE, and Mac SE/30.

The video port at the back of the machine allows for external video. The signal coming out is very simple—it's just the signal used to update the active matrix LCD—but Apple plans to bring out external video adapters for standard Mac monitors, NTSC output, and monitors using the European PAL standard.

Tracking Down a New Keyboard

The 63-key, built-in keyboard has a standard Macintosh layout: much like the regular Apple keyboard, though without a numeric keypad; the Enter key is down by the space bar.

Being portable means eliminating the

necessity for mouse desktop space. While the Macintosh Portable has an ADB port in the back for a mouse, and comes with one, the Portable also has a built-in trackball. A long bar located just below the trackball serves the same purpose as a mouse button.

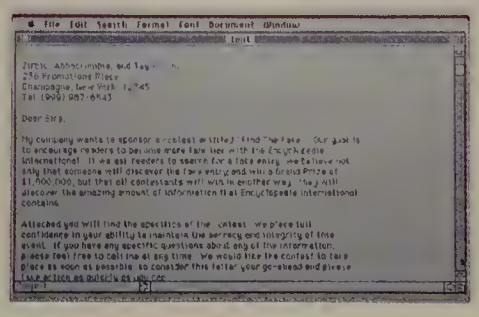
For those of you who absolutely need a numeric keypad, Apple has an optional one, which can be installed in place of the trackball. This means, of course, that you have to plug in the mouse and find desk space to use it (unless someone markets a mouse pad that straps to your thigh). You do have the choice of having the trackball or keypad on the left or the right of the keyboard (see "Keyboard Options"). This requires some dismantling and cable unplugging; Apple says it's best handled by your dealer.

What Kind of Mac?

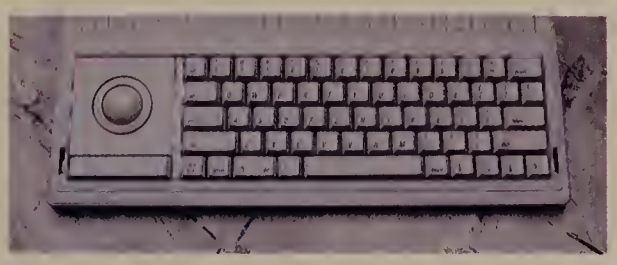
Although the Portable is a fully functional Macintosh in terms of compatibility and operation, it is more akin to a Mac SE than to a Mac II in terms of performance. To begin with, instead of a 68030 or 68020 processor, the Portable has a 16MHz 68000 processor. This is the same processor as the one in the Macintosh SE, but running at twice the clock rate. Processor-intensive tasks (excluding floating-point operations) run about twice as fast as on a Macintosh SE, and about half as fast as on a Mac II (see "Speed Tests"). According to Apple engineers, more powerful processors would have demanded too much power to work within the constraints of the Portable's design.

The system board has 1MB of high-speed static RAM, implemented using 256-kilobit static RAM chips. Static RAM is used because it consumes much less power than dynamic RAM. Using static RAM reduces drain on the battery while you're using the computer; it also makes it easy to preserve the contents of memory when the Portable is shut down. There's a side benefit as well: the static RAM has a very fast access rate (20 to 30 nanoseconds), improving performance. The system architecture can—in theory, at least—accommodate up to 9MB of RAM, though that would require higher-density static RAM chips than are currently available.

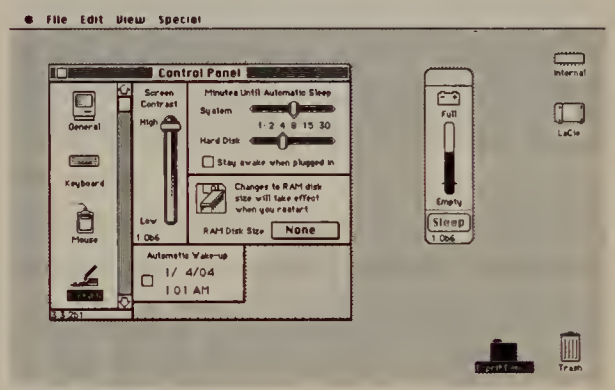
The downside is that static RAM is very expensive and only available commercially in the form of 256-kilobit chips. This creates both economic and technological barriers to putting a lot of memory into a Macintosh portable. Apple plans to market a 1MB board that would fit into a memory expansion slot on the system board; no pricing was given for the board, but $2000 is a reasonable guess, based on current static RAM prices. But even if it were $1500, assuming the lower base system price of $6500, you'd have to pay at least $8000 for a Portable with 2MB of RAM; using the higher estimates for RAM board and Portable, that total jumps up to $9000.



Screen Text
Text is much more readable on an active matrix LCD screen than on a standard LCD screen.



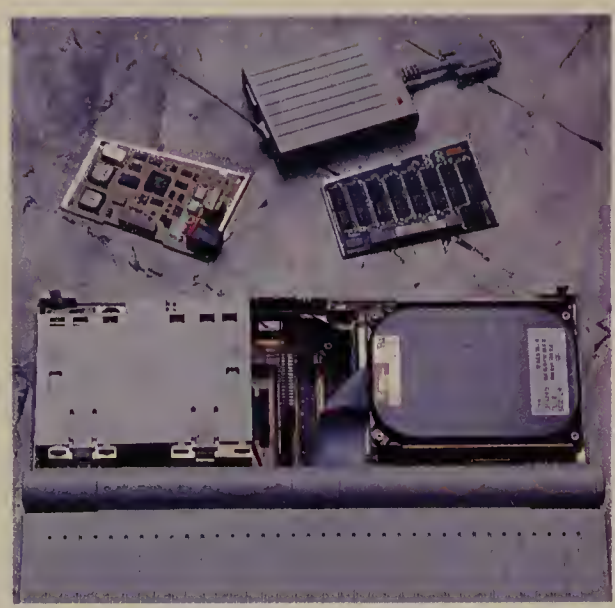
Keyboard Options
The keyboard can be configured with either a trackball or a numeric keypad, either one of which can be positioned to the right or left of the keyboard. Reconfiguring the keyboard is not a simple task; Apple recommends that you ask the dealer to perform this operation.



The Big Sleep
The only system software differences you are likely to notice are the addition of a battery-monitoring desk accessory, which monitors the Portable's charge, and a new CDEV that enables you to control the amount of time before the Portable goes to sleep when inactive.

Expansion Slots

Other aspects of the Macintosh Portable's architecture demonstrate its similarity to an SE. The Portable comes with 256K of ROM, implementing a superset of the Mac SE ROM. This means no color or gray-scale support. The Portable also has relatively limited bus expansion capabilities, which is to be fully expected in a computer that must conserve power. Although there are three slots, only one of these can be considered close in capability to a slot in a Mac SE, SE/30, or II. Like the SE/30's, this expansion slot is called the Processor Direct Slot (PDS), but it is yet another standard Apple interface (joining those on the Mac SE, the Mac SE/30, and the Mac II/IIx/IIcx). The Portable's PDS is a 120-pin socket, identical physically to the one found on the Macintosh SE/30, but with a somewhat different set of signals. The people at Apple didn't mention any specific products designed for this slot, but did mention it in the context of networking, which suggests that perhaps an Apple or third-party Ethernet controller may be



Internal View
Removing the back of the Portable's case reveals the floppy disk drive and hard disk, as well as slots for an internal modem, ROM boards, and RAM expansion. In the background are (left to right) an internal modem, a video adapter, and a RAM board.

in the works. Even so, expansion products will be somewhat limited by the small size of the slot even when compared with that of the SE and SE/30.

The other two slots are more limited in capability (see "Internal View"). One is a ROM slot, designed to accommodate a third-party or user-designed board containing up to 3MB of ROM. Such a board can contain code and/or data, such as custom (or commercial) applications, reference tables, and so on. The ROM board is treated like a high-speed, read-only mass storage device; code in the ROM cannot be executed directly but first must be copied into RAM, so it doesn't really help you stretch available RAM. The third slot is an 18-pin modem slot, designed to accommodate an internal 2400-baud modem, another option from Apple (no pricing given).

The Macintosh Portable is never really off; in fact, it has no on/off switch. Most of the time it is in the sleep state.

Power Supply

The Macintosh Portable uses a lead-acid battery for power, rather than the NiCad (nickel-cadmium) batteries usually found in portables and laptops. Apple gave several reasons for going with lead-acid over NiCad, but the two most significant were charging cycles and power monitoring. NiCad batteries are a bit of a pain to recharge; unless you completely drain them before recharging, they tend to hold less and less of a charge. According to Apple, the lead-acid batteries don't have that problem; you can recharge them at any time and in any condition without getting the NiCad "memory" effect. They also recharge more quickly, taking about three hours to fully charge if you're not using the Portable, and six to eight hours if you are.

According to Apple, it's also easier to directly monitor the power level of a lead-acid battery. The result is the Battery DA and warning software shipped with every Macintosh Portable. The Battery DA displays a thermometer-like gauge showing how much charge is left in the battery (see "The Big Sleep"). The computer itself monitors the battery's power level, issuing warnings recommending that you plug the Portable in to an outlet somewhere before you lose too much power. Should you ignore the warnings, the computer will eventually shut itself down altogether; at that point, you have about four days to recharge the battery before the memory loses its contents.

Apple plans to sell extra batteries, as well as an external battery charger. A standard 9-volt battery maintains the contents of RAM while you swap lead-acid batteries. Also, the power adapter has a built-in transformer that automatically adapts to power levels ranging from 70 to 270 volts, allowing you to use the Macintosh Portable in most countries.

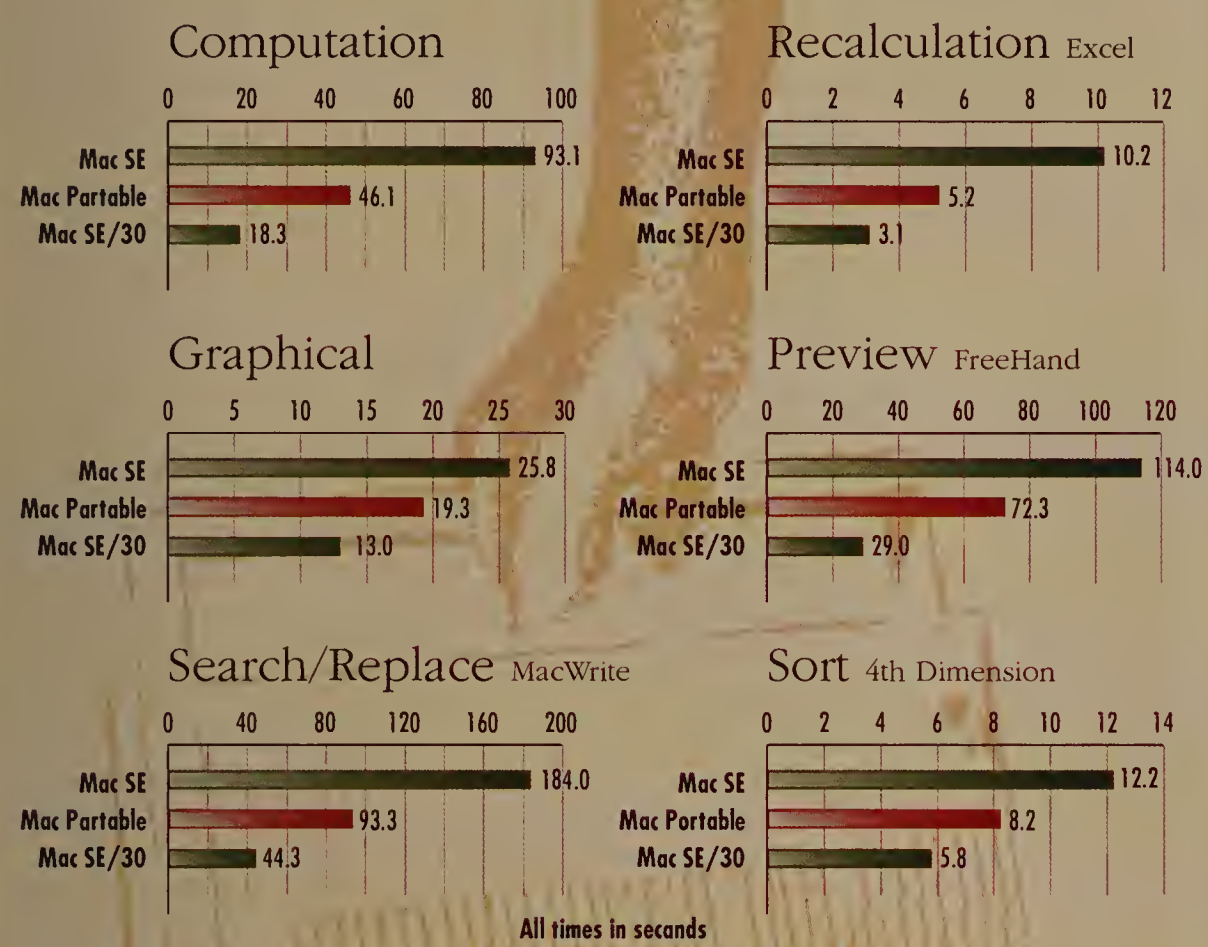
Power Management

Although the lead-acid battery has some obvious advantages over NiCad, its presence doesn't explain the extended hours of use claimed by Apple for the Macintosh Portable. The extra hours are provided by the whole power-management system built into the Portable; if Apple's claims are accurate, then this represents the other great breakthrough (along with the screen) in portable technology.

The Macintosh Portable's system board has a Mitsubishi 5073 processor, which acts as the power manager on a chip. This chip actually handles a number of functions—including supplying clock and calendar information, maintaining parameter RAM, and controlling the ADB port—but its main function is to monitor system activity and shut down or activate systems as required.

Here's how it works. When you're using the Macintosh Portable, it's running at full speed. However, if there has been no discernible user or program activity for a specified period of time—no use of the keyboard, mouse, or trackball, and no changes to the screen display (such as a moving cursor)—then the power manager puts the Portable into rest mode, decreasing the system clock rate from 16MHz to 1MHz (which slows down all system activity) and shutting off the display. When unused, the hard disk controller shuts itself down and the hard disk stops spinning. If a further time period goes by without any activity, the Portable goes into sleep mode; the manager turns off the CPU completely, and the power

Speed Tests



Macworld Labs ran some preliminary tests comparing the performance of the Mac Portable with that of the SE and the SE/30. All tests were performed using the same 300MB hard disk under a beta version of System 7.0. Results may vary somewhat under production versions of the system software. A special program, written by the author, conducted and precisely timed several number-crunching and drawing operations, the results of which appear in the Computation and Graphical charts. The other tests timed common operations on familiar application programs: searching a 103K MacWrite 2.0 document for a 3-letter string and replacing that string with a 14-character text string; recalculating a 235K worksheet file in Microsoft Excel 1.5; previewing a 104K file in FreeHand 2.0.; and sorting 1544 records by a single field in 4th Dimension 1.06.

Have Mac, Will Travel
Folded up, the Macintosh Portable looks a lot like a portable typewriter. Slimness is its chief physical virtue when compared with an SE (since it weighs almost as much). The carrying case is in the background.

manager itself slows down, briefly checking every 1/60 second to see if anyone has used the keyboard, mouse, or trackball. When that finally happens, the power manager brings the system back to full speed immediately, turning the display back on at the same time.

The upshot of all this is that the Mac Portable is never really off; in fact, it has no on/off switch. Instead, most of the time it is in the sleep state, with just a bare trickle of current from the battery being used to maintain the contents of RAM. When you open the lid and press any key, the Portable instantly comes to full activity: all applications that were in RAM before are in the same state. Likewise, you can put the Portable into the sleep state.

As mentioned, Apple claims that this power management results in anywhere from six to ten hours of regular work on a full battery charge, with increased floppy- and hard-disk access dragging you toward the lower figure. With a 2MB system, you can configure a RAM disk, move the System files over to it, and avoid most disk access; Apple claims that by using this method you can get upwards of 15 hours' work out of a full battery charge.

Farther to Travel

Apple's avowed market for the Macintosh Portable comprises sales and marketing professionals; executives; educators; and service professionals such as accountants and insurance adjusters. The unspoken corollary is that these groups have to have money to burn. They also have to be fairly hardy—even with the carrying case and shoulder strap, I'd hate to lug a Mac Portable more than a few city blocks.

There are, of course, enough people who fit that profile for Apple to sell quite a few Portables, at least at first. However, my guess is that sales will level off once the initial demand is satisfied, and that there will be little growth until Apple addresses one or more of the chief drawbacks: weight, size, price, and performance.

The Mac Portable is an impressive example of high-tech engineering, and sets new standards in display and power technology. The design team that built the Portable deserves recognition for its accomplishments. Whether Apple's marketing position for the Portable is equally deserving remains to be seen. It appears for the moment that most users will continue to dream of a smaller, more powerful, and less expensive Macintosh. ■

See Where to Buy *for contact information.*

Bruce F. Webster, *lacking a battery-powered IIcx or, for that matter, a regular one, uses power outlets wherever he can find them.*

Network

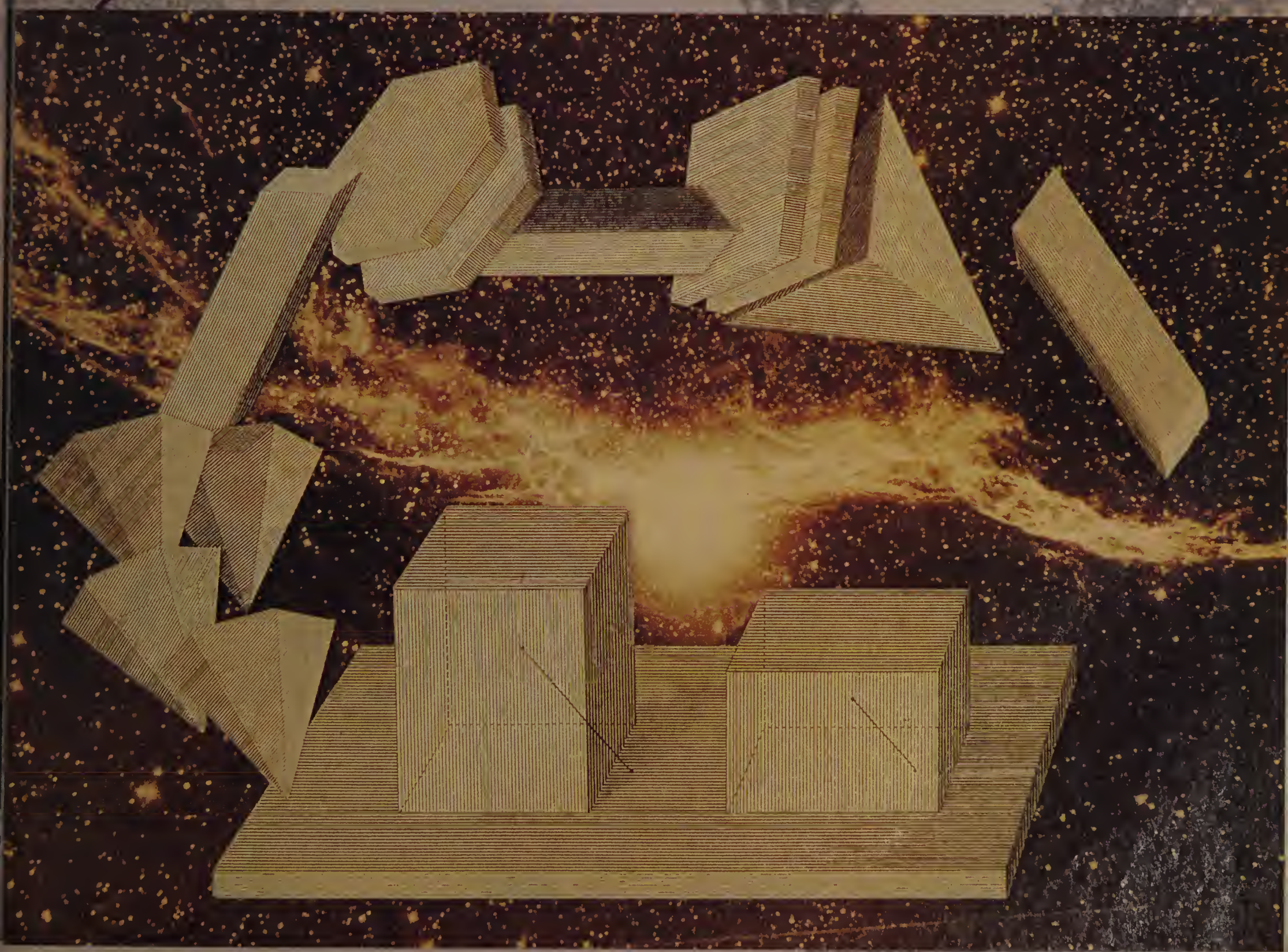
by Dave Kosiur

A lot has happened in the networking world in a year and a half

When I first attempted to survey options for an AppleTalk networking overview (see "Expanding the Conversation," Macworld, *May 1988), I examined topics such as network topologies, servers, and software. Although these issues remain pertinent today, there are new things to consider as far as AppleTalk networking is concerned.*

For one, there are more players and network products than before. In fact, network services now available to small, workgroup-based AppleTalk local area networks (LANs) easily rival those available to any IBM PC

Connections



MALCOLM TARLOFSKY

network. Second, Apple has redefined some AppleTalk network protocols to accommodate larger networks.

From the Bottom Up

While the original LocalTalk cables are easy to work with, they aren't always the best way to wire a network. This is particularly true when companies want to use existing cabling—like telephone systems or Ethernet—to connect a network. Luckily, the AppleTalk protocols can run on nearly any variety of network media. (Remember, *AppleTalk* refers to the overall architecture—the protocols—of the AppleTalk network; *LocalTalk* is Apple's name for the twisted-pair cables that the protocols run over.)

Farallon's PhoneNet system, which uses unshielded twisted-pair wire like that of telephone wiring systems, has long been the best-known alternative to LocalTalk. Due no doubt to PhoneNet's success, many companies now offer similar connectors (see "Connecting by Phone").

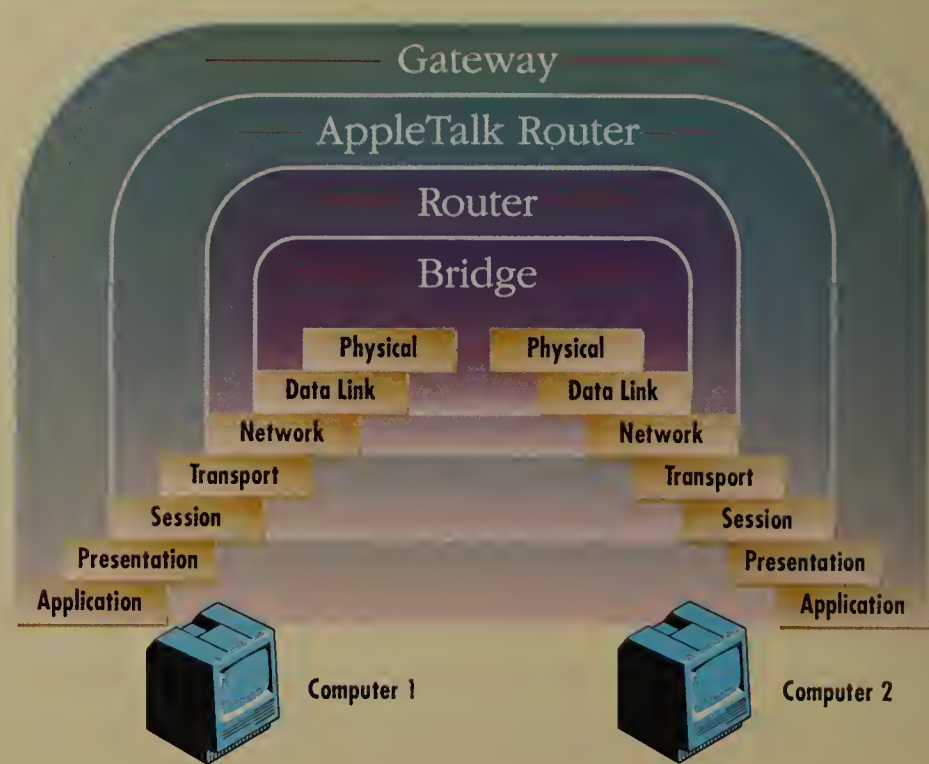
One new development is the introduction of DaynaTalk from Dayna Communications and FlashTalk from TOPS. I

CONNECTING BY PHONE

Product	Company	Price
AT-1 CampuTalk connector	AESP	$65
AT-1L Lacking CompuTalk connectar	AESP	$75
ATPLUS3 LocalTolk Concentrotor	AESP	3 devices-$185
ATPLUS4 LocalTalk Concentrotor	AESP	4 devices-$230
ATPLUS5 LocalTalk Concentratar	AESP	5 devices-$275
ATW-1 Smart Wallplate	AESP	$140
(with CampuTalk connectar)		
BelTalk	Belkin Companents	$59
CompuNet	Trimar USA	$29.95
IPT 230/A	Infarmation Presentotian Technolagies	$495
LocalTalk	Apple Camputer	cannectar kit $75; 10m cable $75;
		25m coble $125; custom wiring kit
		(100m coble, 20 connectors) $849
LP-1 Locol PhoneTolk connector	AESP	$59
MagicNet	MacPraducts USA	$19.95
MixNet 8884	Thar Manufacturing	$79
MaduNet	DataSpec	MDT-M8 $37.95; MDT-D9 $43.95;
		MDT-D25 $47.95
PhaneNet Plus	Forollon Computing	DIN-8 ar DB-9 $59.95; DB-25 $75
Q-Talk	Laser Connection	$59
QuikNet	Belkin Companents	$49
TOPS TeleConnectars	TOPS divisian, Sun Micrasystems	$59
TurboNet	Nuvatech	$49.95
TurboNet ST	Nuvatech	$59.95

You Say Router...

There has always been a lot of confusion as to what bridges, routers, and gateways are in the AppleTalk world. To illustrate the difference, let's look at them using the OSI layer model. Traditional bridges are protocol-insensitive, meaning that they link LANs purely at the top two layers—for example, Ethernet and token ring. Traditional routers, on the other hand, are protocol-sensitive; they connect LANs at the top three layers. Thus, a router could link LocalTalk and EtherTalk nets, but not LocalTalk and Ethernet nets running DECnet or TCP/IP. AppleTalk routers, as Apple defines them now, are more intelligent than traditional routers, because AppleTalk routers can maintain AppleTalk zones. Gateways link two LANs running completely different protocol suites—AppleTalk on LocalTalk and TCP/IP on Ethernet, for example. Gateways are responsible for converting protocols across all seven layers.



call these intermediate-speed networks because they operate at speeds three to four times faster than LocalTalk, but not as fast as Ethernet. DaynaTalk and FlashTalk are designed to coexist with existing LocalTalk installations, but each requires special software and/or hardware to deal with collisions that can occur when network packets are transmitted at different speeds on the same cable.

Moving to higher-speed networks, the number of Ethernet interface products for the Mac almost doubled in the past year (see "Hooking to Ethernet"). Ethernet-access pioneers like Kinetics, Dove Computer, 3Com, and Apple have expanded their own offerings to support new Mac models like the SE/30. In addition, companies such as Asante Technologies, Compatible Systems, Cayman Systems, and Everex now offer Ethernet add-in boards for the Mac.

Such boards provide connections via the coaxial cables most commonly used with Ethernet. Several companies have started to support Ethernet connectivity over unshielded twisted-pair wiring. Two products, the EtherPort SE/L and the EtherPort IIL from Kinetics, already offer the capability for twisted-pair Ethernet. Farallon now provides connectors for twisted-pair Ethernet as well as an Ethernet version of Farallon's StarController.

Although the standards aren't final, twisted-pair Ethernet—or 10BaseT, as it's called—is designed to use two pairs of wire rather than a single pair as PhoneNet does. Converting an existing PhoneNet network to Ethernet requires an extra wire pair leading to each connector or face plate. Not only that, but you cannot use typical flat modular phone cable for twisted-pair Ethernet; you need what's called DIW (wall) cable, like that used in AT&T's premises wiring scheme.

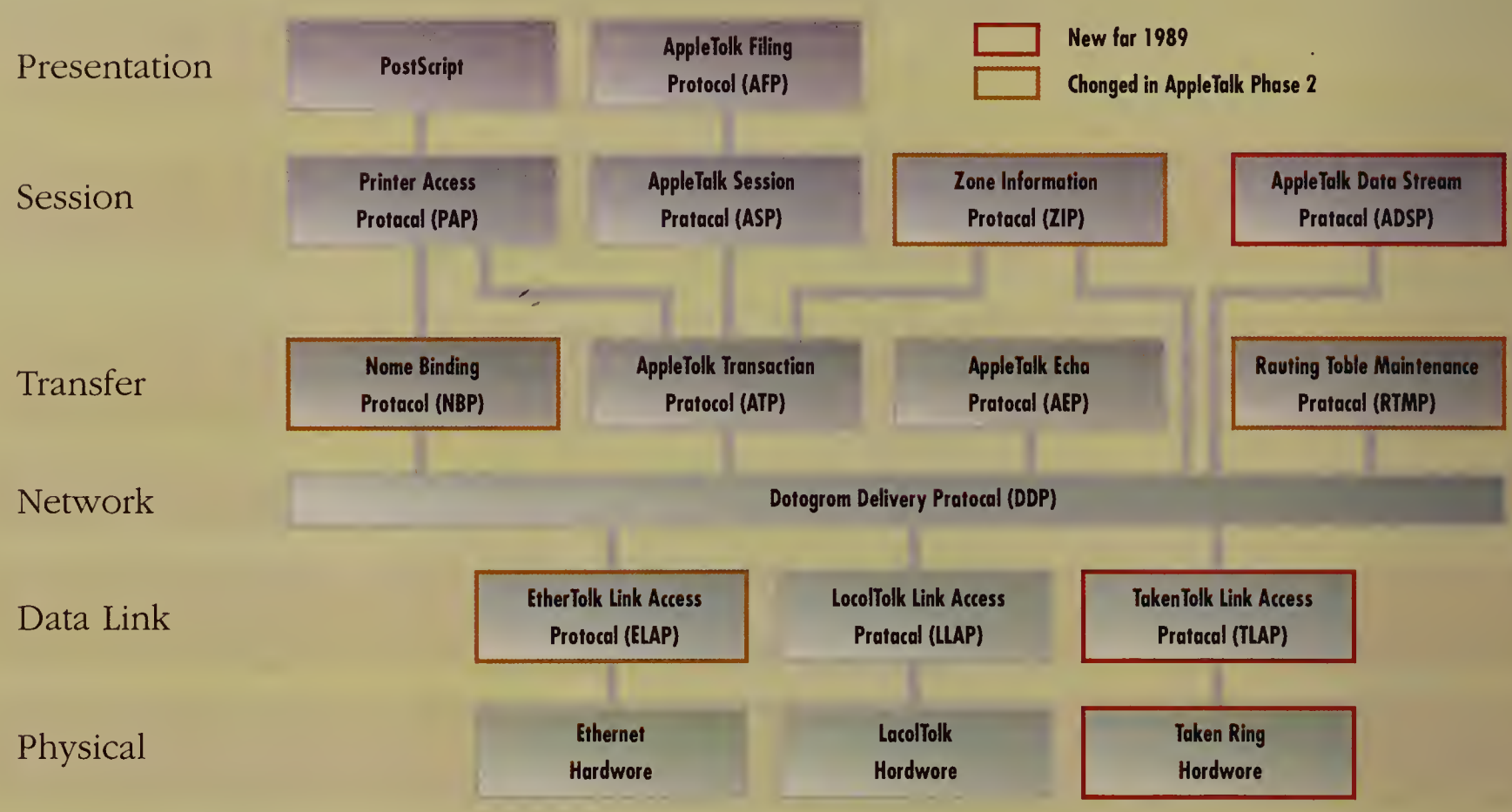
New Connections

The new alternative for corporate Mac wiring schemes is token ring, an important element of IBM's Systems Application Architecture (SAA) and a standard in its own right. Estimates indicate that the number of token ring network installations now almost equals those using

HOOKING TO ETHERNET

Product	Company	Price
BOARD		
EtherLink/NB	3Com Corporotion	$495
EtherLink/SE	3Com Corporotion	$595
EtherPort SE	Kinetics, division of Excelon	$595
EtherPort SE/L	Kinetics, division of Excelon	$645
EtherPort SE/30	Kinetics, division of Excelon	$595
EtherPort SE/30L	Kinetics, division of Excelon	$645
EtherPort II	Kinetics, division of Excelon	$595
EtherPort IIL	Kinetics, division of Excelon	$645
EtherPort IIL	SynOptics Communicotions	$695
EtherTolk NB Cord	Apple Computer	$699
FostNet SE	Dove Computer Corporotion	$599
FostNet II	Dove Computer Corporotion	$899
FostNet III	Dove Computer Corporotion	$599
GotorCord E/SE	Coymon Systems	not ovoil.
GotorCord E/30	Coymon Systems	not ovoil.
GotorCord E/II	Coymon Systems	$695
IPT 1000 (SE)	Informotion Presentation Technologies	$495
MocCon SE/E	Asonte Technologies	$395
MocCon SE30/E	Asonte Technologies	$595
MocCon II/E	Asonte Technologies	$595
Moc2000	Network Resources	$895
MoroThon LAN 020	Dove Computer Corporotion	$1499–$2499 depending on RAM, options; Thick Ethernet tronsceiver $149
NAE 1000	Novell	$595
NAE 2000	Novell	$595
NIA310 MocConnect	Interlon	$549
NuvoNet ET (50-meter tronsceiver)	Nuvotech	not avail.
NuvoNet ET (100-meter tronsceiver)	Nuvotech	not ovail.
SpeedLink	EMAC, division of Everex Systems	$549
EXTERNAL BOX		
AT2000	Network Resources	$995
AT2002	Network Resources	$1295
Ether+	Compotible Systems	$495
EtherSC	Kinetics, division of Excelon	$1250
FostNet AE	Dove Computer Corporotion	$1299
FostNetSCSI	Dove Computer Corporation	$1249
FostPoth 4	Kinetics, division of Excelon	$2795
GotorBox	Coymon Systems	$2795
IPT BB	Information Presentation Technologies	$1B95 ($295 per added board for o LocolTalk network)
Nodem	Adoptec	$595
NuvoLink SC	Nuvotech	$495
OTHER		
NuvoStor ET	Nuvotech	not avoil.
PhoneNet StorController EN	Farollon Computing	$2495

AppleTalk Now and Then



By looking at the AppleTalk protocol suites, you can see where the changes were made for Phase 2. In the past year, some new items like ADSP and TokenTalk have been added. Phase 2 also necessitated changes to protocols used to name network zones and maintain routing tables.

Ethernet across the United States.

Soon after Apple officially announced its TokenTalk NB interface board for the Mac—something Apple talked about doing for at least a year—other companies began introducing competing token ring interfaces. The variety of choice for token ring boards isn't nearly as great as that for Ethernet, but that's because token ring is a newer networking technology, especially for Macs. All of these boards currently support the older 4-megabits-per-second token ring; you should expect future boards to support the faster 16-megabits-per-second token ring as the demand for network speed grows.

Other media options for networking Macs do exist (see "More Options for AppleTalk"). IBM's original PC LAN network depended on broadband media like that used for cable television signals, rather than baseband media such as Ethernet. Although there's been a major switch to token ring in the IBM camp, the popularity of broadband LANs is on the upswing again. Products from Cactus Computer allow you to attach Macs, or a LocalTalk LAN, to broadband networks.

There's also a move toward wireless LANs, using either infrared (IR) or radio waves. Photonics was the first company to introduce an IR-based system for LocalTalk in office environments. And the highly secure, radio-wave–based ARLAN system can be used for creating portable networks, mainly in open spaces.

Putting Nets Together

Apple originally recommended a maximum of 32 nodes per LocalTalk LAN. If you used bridges to join networks together to form a larger internet, the AppleTalk protocols limited you to 254 nodes.

With the introduction of AppleTalk Phase 2, the maximum number of nodes for an AppleTalk LAN is over 16 million (see "AppleTalk Then and Now"). And Apple changed its network nomenclature. What was called an AppleTalk bridge is now called a router (see "You Say Router . . ."). The function of the AppleTalk bridge hasn't changed, only its name.

Partly due to expanding AppleTalk network sizes—even before the introduction of Phase 2—routers are in high demand (see "On the Net"). A year and a half ago, I could point to only three routers: Solana's R-Server, Hayes's InterBridge, and Shiva's NetBridge. Now there are seven routers that enable direct connections between LocalTalk LANs: Apple's AppleTalk Internet Router, Infosphere's Liaison (software-only solutions), Solana's I-Server, InterBridge, NetBridge, P-Ingenerie's InterTalk 2, and Nuvotech's TurboBridge (hardware solutions). There are four products that can connect LANs over modem links: Liaison, InterBridge, Solana's R-Server, and Shiva's TeleBridge.

If you travel with the Mac, you have more options for remote AppleTalk ac-

cess. Such products let you take advantage of network services (electronic mail or file servers, for example) via modem. They include Shiva's NetModem and NetSerial, DataSpace's Telenode, and R-Server. Liaison also permits dial-in access to an AppleTalk network. In addition, several products such as the NetModem and the NetSerial allow modem-sharing by networked users. Hayes's Smartmodem 2400M is restricted to sharing for networked users dialing out, and can't be used by anyone dialing into a network.

Dial-in access to a network usually necessitates some type of security measures so unauthorized users can't just call in. Simple password protection for users and hidden zones—offered with all dial-in products—may be enough to protect the network's resources. Liaison provides more stringent security measures; it includes a dial-back option to register the dial-in user, hang up, and redial the remote user at a predetermined phone number.

Service with a Smile

Apple's evangelism for its AppleTalk Filing Protocol (AFP) has led to a larger number of file servers becoming available for use by AppleShare clients. Macintosh users aren't the only ones who can access AFP servers; PC users can, using Apple's AppleShare PC. AFP server software now runs on Macs, PCs, VAXes, and UNIX computers, as well as on specially constructed boxes (see "Service, Please").

Jasmine's DirectServe is a self-contained box with AppleShare code in ROM and a SCSI port that you plug hard disks in to. These hard disks can then act as AppleShare server volumes for a network, once the DirectServe is on the net.

PCs are getting converted into AFP servers for AppleTalk networks. The pioneer product for this capability, Tangent Technologies' TangentShare, was bought by DayStar Digital and is now known as FS100. DaynaNet from Dayna Communications and Miramar's MacLan Connect also enable you to use PCs as AFP servers.

Two giants of the PC networking market are now fighting it out for Mac users as well. 3Com has been an early supporter of network services for the Mac; Novell, with its NetWare for the Mac, only recently integrated Mac support into its network operating system. 3Com's support of the much-ballyhooed SQL Server in the forthcoming release of 3+Open for the Mac should open some new vistas for Mac users. (In fact, 3Com's support of SQL Server may well give Apple's CL/1 a run for the money when it comes to networked database access.) Even Novell plans to provide access to SQL Server for Macs when it adds OS/2's Named Pipes support to NetWare for the Mac.

ROBERT HOLMGREN

It took four years for Dick Allen, the founder and president of Photonics of Campbell, California, to find a viable alternative to cable. His invention, Photolink, uses infrared light to network Macs.

MORE OPTIONS FOR APPLETALK

Product	Company	Price
TOKEN RING		
GatorBox T	Cayman Systems	$3495
MacCon II/TR	Asante Technologies	with Logical Link Control $795; without Logical Link Control $695
MacRing	h-three Systems Corporation	$795
TokenTalk NB Card	Apple Computer	$1250
ARCNET		
Actinet SE	Actinet Systems	$395
Actinet II	Actinet Systems	$695
ARCNET220/II	Standard Microsystems	$595
X.25		
AdCom2-I	Frontier Technologies Corporation	board $1495; software $995
MocX25	Apple Computer	$800
Samba Bridge	Connectica	$800
FIBER OPTIC		
AT2000	Network Resources	$995
AT2002	Network Resources	$1295
Fiber Optic AppleTalk Concentrator	The Du Pont Company	$950
Fiber Optic AppleTalk Converter	The Du Pont Company	$250
Moc2000	Network Resources	$895
OTHER		
ARLAN 510-AppleTalk Wireless Router	Telesystems SLW	$2500
AT2000 (broadband)	Network Resources	$995
AT2002 (broadband)	Network Resources	$1295
BroadTalk LAN	Cactus Computer	BroadTalk LAN board & Broadband module $895; BroadTalk LAN board & Ethernet module $745; BroadTalk/Ethernet gateway $2985
DaynaTalk	Dayna Communications	$189
DaynaTalk PC	Dayna Communications	$289
LANstar Interface Board	Northern Telecom	$249
Mac2000 (broadband)	Network Resources	$895
PhotoLink	Photonics Corporation	four nodes $995
TOPS FlashBox	TOPS division, Sun Microsystems	DIN-8 $189; DB-9 $189
TOPS FloshCard	TOPS division, Sun Microsystems	$239

Things have changed even on the distributed server front. TOPS once had the field all to itself. Now, Information Presentation Technologies offers its Personal Server Network, which, in addition to being a distributed file server system like TOPS, is also fully AFP compatible. The most recent version of TOPS, TOPS 3.0, is AFP compatible in that it includes support for database use of AFP's file-locking and record-locking protocols; however, TOPS still uses its TOPS DA interface, not the Chooser as other AFP-compatible servers do.

Effects of System 7.0

In addition to what some third-party vendors are doing, Apple's plans for its new system software, System 7.0, also will ultimately affect the way you work with networks (see "All Together Now"). The most important of these is Apple's interapplication communication (IAC) framework. (For more information on System 7.0, see "Here Comes System 7.0," *Macworld*, August 1989.)

Most of the talk about IAC concerns its ability to let applications running on one

ON THE NET

Product	Company	Price
ROUTERS		
AppleTolk for VMS	Apple Computer	site license $5000
AppleTolk Internet Router	Apple Computer	$399
Cisco Routers	Cisco Systems	$7200 ond up
InterBridge	Hoyes Microcomputer Products	$799
InterTolk 2	P-Ingenerie	$695
I-Server	Solono Electronics	$695
Lioison	Infosphere	$295
LT2000	Network Resources	$1995 (supports Ethernet, broodbond, ond fiber optic bockbones)
NetBridge	Shivo Corporotion	$499
R-Server	Solono Electronics	$595
TeleBridge	Shivo Corporotion	$499
TurboBridge	Nuvotech	$499
PERIPHERAL SHARING		
C-Server (seriol printers, seriol devices)	Solono Electronics	$695
Doisy Wheel NT (doisy wheel, dot motrix printer)	DotoSpoce Corporotion	$745
ImogeWriter II/LQ LocolTolk Option	Apple Computer	$139
Lioison (printer, modem)	Infosphere	$295
NetModem V2400 (modem)	Shivo Corporotion	$599
NetSeriol X232 (modem, serial device)	Shivo Corporotion	$399
Plotter NT (plotter)	DotoSpoce Corporotion	$2695
Printer NT (seriol printer)	DotoSpoce Corporotion	$855
R-Server (modem)	Solono Electronics	$595
SilverPlotter (hard disk)	Lo Cie	stond-olone $99.95; bundled with Cirrus drives
Smortmodem 2400M (modem)	Hoyes Microcomputer Products	$549
OTHER HARDWARE		
LinkStor 8	Thor Monufocturing	$775
PhoneNet Repeoter	Forollon Computing	$495
PhoneNet StarController	Forollon Computing	$1695
Telenode	DotoSpoce Corporotion	$695
TOPS Repeoter	TOPS division, Sun Microsystems	$189
Turbo Stor	Nuvotech	$1795

ALL TOGETHER NOW

A new class of software is being developed for networked computers, and the first examples of this genre (called groupware) have become available for the Mac. Farallon's Timbuktu was the first groupware program for the Mac, allowing two or more users to see the same screen on their own Macs over the network. All the networked users have control of that one Mac; everyone can see what is being done and can provide input.

Timbuktu Remote provides the same capabilities between a poir of users connected via modems and a phone line. Microcom Software's Carbon Copy Mac, a program developed by Nexus Development in Australia, combines the functions of Timbuktu and Timbuktu Remote into one program.

Real groupware builds on the idea that computers can take care of some activities needed to tie coworkers together. Imagine Software's Perfect Timing is a scheduling program that allows you to set up meetings and other appointments. The Mac collects the responses of the other members to see if everyone can attend. You don't have to initiate contact with every member of the meeting, you simply get the tally of who can and cannot attend.

Another venture into the groupware realm is group editing. The first Mac product to provide this is Mainstay's MarkUp, closely followed by Farallon's Annotator. (Annotator is actually more than a group editing program, but I won't go into the distinctions here.) Basically, MarkUp allows you to send a copy of any document to other users for review. They then add their comments or new figures, or whatever, to a transparent layer atop the original document. A database on the server keeps track of the times when each reviewer has dealt with the document.

Mac talk to each other. But thanks to Apple's plans to incorporate a store-and-forward architecture and network awareness for IAC, you'll be able to use new features—live copy/paste, AppleEvents, and low-level interprocess communication (IPC)—over an AppleTalk network.

Live copy/paste permits dynamic linking and information interchange between graphics and/or text documents. It uses a procedure it calls publish/subscribe: you publish (copy) a document so that others can subscribe to (paste) it. Because the link is dynamic, any changes made in a published document are reflected in its subscribers' copies. You'll be able to use live copy/paste with file servers to pass document changes to inactive users once those users join the network.

The purpose of AppleEvents is to provide a common vocabulary so that users can write customizable scripts that combine applications. Since IAC is supposed to work from any application, you could use the scripting capability of HyperCard to perform just about any operation you can think of on the Mac, using local resources or network resources.

The real power for controlling network resources will exist once Apple produces a system scripting language (probably based on HyperTalk and AppleEvents). And Apple's plan to provide aliasing capabilities in System 7.0 also means that you won't need to know where a particular resource is to use it.

Adolescent or Adult?

AppleTalk has more growing up to do. Some pieces are still missing for seamless integration with other systems—especially for networking by the other player's rules. For example, there's room to improve token ring file-transfer utilities and interfaces with MS-DOS and OS/2 in general. Some of System 7.0 should deal with these kinks in the network, at least from the Mac's point of view.

One piece missing from AppleTalk becomes more obvious as AppleTalk matures into a corporate networking scheme. Ask any AppleTalk network manager what's the biggest problem with AppleTalk, and the answer will be network management. So far, Apple has done little to implement network management. Unlike other network architectures, AppleTalk doesn't include any network-management protocols. And as far as tools, Apple only offers InterPoll. Some third-party vendors—Farallon and Kinetics, for example—have released their own products to pick up the slack. While such tools make managing a network easier, none is the definitive network-management tool.

Still, there's no doubt that AppleTalk networks have progressed beyond the early stages of Mac-to-LaserWriter networking. Lack of Mac connectivity to other computers is a thing of the past, and AppleTalk Phase 2 features are signs of a maturing network architecture. Together with products from third-party vendors, Apple's enhancements of its AppleTalk network protocols will bring AppleTalk nets into the corporate mainstream. ■

See *Where to Buy* for contact information.

Dave Kosiur, *a* Macworld *contributing editor, is the publisher of* Connections, *an international newsletter concerned with Macintosh networking.*

SERVICE, PLEASE

Product	Company	Price
AlisaTalk/AlisaShare	Alisa Systems	$4700–$21,500 depending on VAX CPU
AppleShare	Apple Computer	$799
DaynaNet LocalTalk	Dayna Communications	$1249; upgrade from LocalTalk to EtherTalk/LocalTalk version $699
DirectServe	Jasmine Technologies	$1299
FS100	DayStar Digital	AT Bus $595; MicroChannel Bus $695
K-Share	Kinetics, division of Excelan	$795
MacLan Connect	Miramar Systems	$995
MacServe	Infosphere	$250
Netware for Macintosh	Novell	Netware 2.15 $4695; Netware for Mac/site $200; hardware extra
PacerLink	Pacer Software	$200–$37,500, depending on number of users
PacerShare	Pacer Software	$400–$7500, depending on number of users; requires PacerLink
PacerShare/Ultrix-32	Pacer Software	$400–$7500, depending on number of users requires PacerLink
PacerTOPS	Pacer Software	$400–$7500, depending on number of users; requires PacerLink
Personal Server Network	Information Presentation Technologies	2 nodes $149.95; 10 nodes $499.95; 20 nodes $999.95
SilverPlatter	La Cie	$99.95
SilverServer	La Cie	stand-alone $99.95; bundled with Cirrus drives
3+ Share	3Com Corporation	3+Share $2495; 3+ for the Macintosh (in addition to 3+Share) $495; hardware extra
TOPS/Macintosh	TOPS division, Sun Microsystems	$249 per Macintosh
u-Share	Information Presentation Technologies	$1195 and up, depending on configuration
Waterloo MacJanet	Wotcom Products	$995 educational USA; $1950 commercial USA

High-Capacity Hard Disks

Macworld reviews 23 high-capacity drives

by Cheryl England Spencer

Normally I don't get too excited about hard disks. But I don't normally have hard disks with 300 megabytes or more attached to my Mac. I first fell in love with these hard disks because of their speed. After a while, I grew used to having applications open instantly and folders pop up quickly—that's when I realized just how nice it is to be able to install all the applications I want and still have room for every scrap of data.

Unfortunately, high-capacity hard disk prices are prohibitively expensive for most people. The cheapest 300MB disk that Macworld Labs tested costs $2095, while the cheapest 600MB disk takes an even bigger chunk of pocket cash—almost $3000. As a result, only users who need large file servers for network data storage, or who have huge files such as color graphics or sound to store, can really justify the cost.

Given the high price of these hard disks, most people should approach the purchase of a high-ca-

PHOTOGRAPHS BY MICHAEL LLEWELLYN

pacity hard disk with care. To find out which high-capacity disks provide the best value, Macworld Labs evaluated 23 hard disks ranging in size from 300MB to 600MB. We performed a variety of speed tests, the results of which are indicated in "Speed Tests." In addition to performance, you should consider a hard disk's size, design, software, reliability, and the quality of the vendor's product support. Read on for the specifics (for Macworld's recommendations, see "Seven Top Drives").

The prices and specifications in this table are for external drives, unless there is only an internal model. Internal drives are usually a bit cheaper than external drives. Benchmark access times were run on a Macintosh IIx.

A Question of Size

All the hard disks tested, with the exception of the Jasmine unit, are physically larger than hard disks containing up to 150MB of storage. External units are often no wider or deeper than a Mac SE, but they range in height from 3½ inches to 8 inches. Only a Mac II or IIx can hold a high-capacity internal hard disk—even then, some hard disks won't fit if you have tall DIP SIMMs installed. There's no way at present to squeeze one of these large hard disks into the Plus, SE, or even the IIcx. However, MicroNet has announced 5¼-inch, full-height 300MB and 400MB hard disks that, with the help of a special bracket, can fit into a Mac IIcx without sacrificing a slot. You can, of course, attach an external high-capacity hard disk to a Mac that can't accommodate an internal one.

Because of the IIcx's cramped internal space, it can't take a high-capacity internal hard disk. Except for Jasmine's unit, which uses a 5¼-inch half-height drive, all high-capacity hard disks are based on 5¼-inch full-height drive mechanisms. Smaller Macs have only enough room in their cabinets for 3½-inch half-height drives (unless, like Micronet, the vendor takes great pains to build a special bracket).

Until recently, the 3½-inch half-height drives maxed out at a capacity of roughly 150MB. Rodime has just introduced a 215MB 3½-inch half-height product, and Maxtor is currently working on a similar 200MB

COMPARING HARD DRIVES

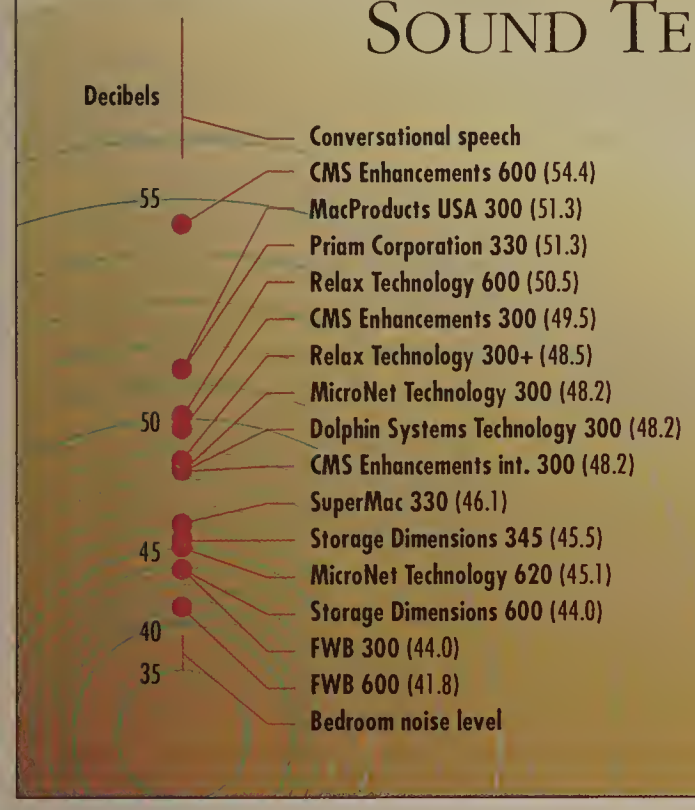
	CMS Enhancements Platinum 300	Crate Technology Mac Crate 300	Deltaic Systems Server 300	Dolphin Systems Technology Integra 300	FWB Hammer300	Jasmine Technologies DirectDrive 300	Lo Cie Cirrus 613	MacProducts Magic 300
Price	$4395	$3045	$2999	$4295	$4395	$2795	$3199	$2095
Formatted capacity	291MB	338MB	291MB	291MB	321MB	325MB	600MB	291MB
External	yes	yes	yes	yes	yes	yes	yes	yes
Internal (Mac II/IIx)	yes	yes	no	yes	no	yes	yes	yes
OEM	Wren IV[1]	Maxtor	Wren IV[1]	Wren IV[1]	Wren IV[1]	Micropolis	Wren V[1]	Wren IV[1]
Other capacities/prices	600MB/$5995	600MB/$4105	600MB/$4999 320MB/$3899	none	600MB/$5895	none	none	600MB/$2995
Physical Specifications								
Fits with high-profile DIP SIMMS	yes	no	n/a	no	n/a	yes	yes	no
Dimensions (h x w x d, in inches)	4.75 x 10 x 11.5	6 x 7 x 11	4.5 x 9.5 x 9.5	5.25 x 10 x 11	5.5 x 9.5 x 10	2.5 x 9.5 x 10.5	4.5 x 9.5 x 9.5	3.5 x 10 x 11
Terminator	internal	internal	external	external	external	internal	internal	internal
SCSI address change	DIP switches	push button	push button	push button	switch	push button	push button	push button
SCSI connectors (Mac to drive)	25/25	25/50	25/50	25/50	25/50	25/50	25/50	25/50
Cable length (in inches)	36	36	18	36	18	24	20	18
Utility Software								
Password protection	no	no	no	no	yes	yes	yes	no
File encryption	na	no	no	no	yes	yes	no	no
Type of partitioning	none	none	soft	hard	soft	hard	hard[2]	none
A/UX partitioning	n/a	n/a	no	no	no	yes	yes	n/a
Number of partitions allowed	n/a	n/a	[3]	4	[3]	256	100	n/a
Volume mounting	n/a	n/a	yes	no	yes	yes	yes	n/a
Miscellaneous								
Warranty period (in years)	1	2	1	1	1	2	1	1
Optional extended warranty	no	no	na	no	yes	no	no	[5]

[1] *Imprimis makes the Wren drives; the numbers denote design and capacity of the particular Wren drive: Wren IV holds 300MB; Wren V holds 600MB; Wren Runner is a faster version of the Wren IV.*

[2] *Hard partitioning, but you do not lose data.*

[3] *Minimum partition size is 130K; number of partitions will vary according to size of file directories.*

Sound Test



Of the hard disks we received in time to test for noise, FWB's hammer series and Storage Dimensions' MacinStor series were the quietest. When the units reached about 49 decibels (Relax's Hard 300 Plus and above), the noise began to bother me a bit. By the time it hit 51 decibels I was really annoyed. Decibel levels were tested with a Brüel and Kjær sound-level meter.

Maxcess M-Series 300	MicroNet Technology Micro/Max S8-330	Microtech Nova 320	PLI Turbo 300	Priam Corporation MacDisk EM330	Procom Technology HiPerformance 320	Relax Technology Hard 300 Plus	Storage Dimensions MacinStor 345	SuperMac Technology DataFrame XP 330
$3495	$4395	$2699	$3795	$4195	$4345	$3495	$4999	$3795
291MB	291MB	323MB	307MB	318MB	320MB	291MB	345MB	322MB
yes	yes	no	yes	yes	yes	yes	yes	yes
yes	yes	yes	yes	no	yes	yes	yes	yes
Wren IV [1]	Wren Runner [1]	Micropolis	Wren IV [1]	Priam	Micropolis	Wren IV [1]	Maxtor	Micrapolis
600MB/$4695	300MB/$3595		635MB/$5995		650MB/$6495	330MB/$3495.11 (Miniscribe)	320MB/$4499	none
620MB/$5495					600MB/$4595	595MB/$6499		
					650MB/$7999			
no	yes	yes	no	n/a	yes	yes	yes	up to 1 inch
5.5 x 9.5 x 9.75	6.5 x 7.75 x 12	n/a	4.75 x 9.75 x 9.75	7.7 x 4.8 x 13.7	6.25 x 7.5 x 12	3.5 x 10.5 x 10.5	7.25 x 4 x 15	8 x 5 x 9.5
internal	internal	internal	internal	external	external	external	external	internal
push button	DIP switches	jumpers	rotary dial	push button	rotary dial	software	rotary dial	software
25/50	25/50	n/a	25/50	25/50	25/50	25/50	25/50	25/50
18	36	n/a	18	48	18	24	18	19
yes	yes	yes	no	no	no	no	yes	yes
yes	no	no	no	no	no	no	yes	yes
soft	hard	none	hard	none	none	none	hard	hard
no	yes	n/a	no	n/a	n/a	n/a	yes	yes
[4]	36	n/a	6	n/a	n/a	n/a	60	9
yes	yes	n/a	yes	n/a	n/a	n/a	yes	yes
2	1	5	1	3	1	1	1	1
no	yes	no	yes	no	no	no	yes	no

[4] *Minimum partition size is 800K; number of partitions will vary according to size of file directories.*

[5] *$400 per repair after warranty expires.*

hard disk. Micropolis and CMS have both announced 3½-inch half-height drives with capacities of 340MB and 320MB respectively.

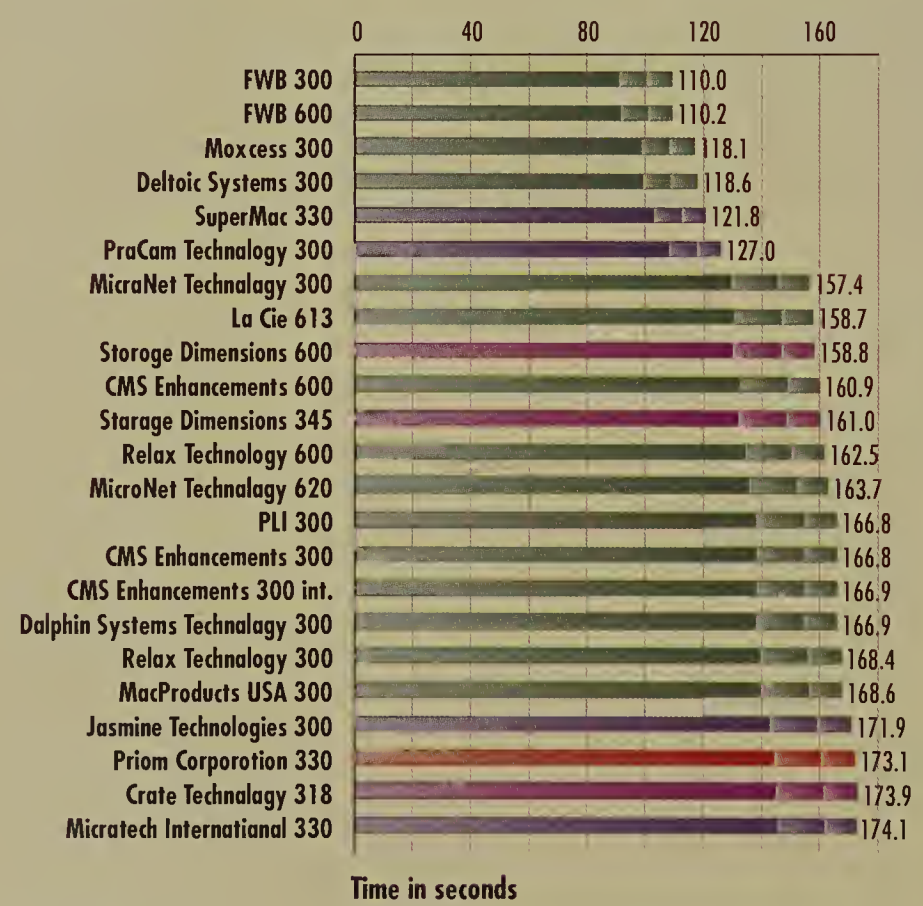
How'd They Get So Fast?

While the physical size of a high-capacity hard disk may be a problem, speed isn't. Vendors can use more expensive, faster technology on these hard disks than on lower-capacity hard disks and still keep the price per megabyte down to the level it is for 80MB hard disks. For instance, high-end hard disks use voice coil actuators, which are more precise and faster than stepper motors. High-capacity hard disks use better technology for the heads and a more expensive platter surface. These hard disks pack more data on the surface so the heads don't have to move as far to get data, resulting in faster access times.

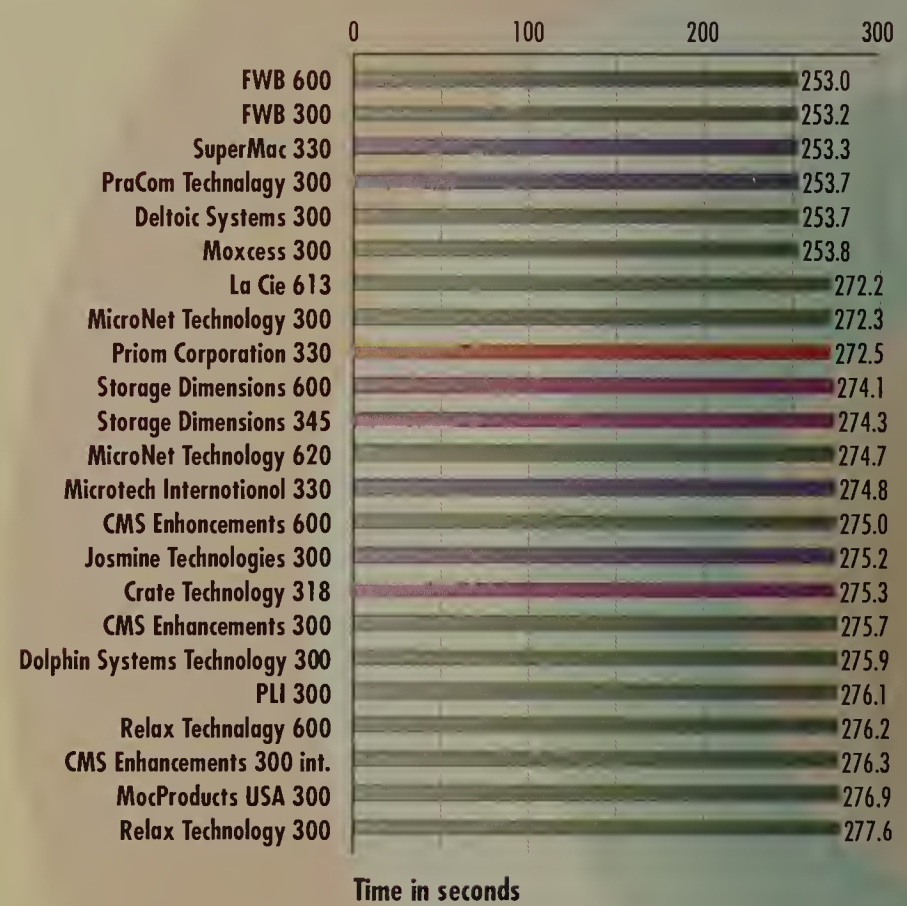
The technology that gives high-capacity hard disks their biggest speed advantage, however, is one that improves the way the drive positions the head over the data tracks. This technique, called dedicated servo surface, uses a disk platter containing just the information that keeps the drive's head aligned over the data track. Lower capacity units, on the other hand, either embed some servo information in the data plat-

Speed Tests

Sequential Access



Database Search



Sequential Access Each of these tests shows the positive effect of a read look-ahead cache. The Load Excel Document test (middle segment) shows the speed with which a drive can access a single file—there's nearly a 50 percent difference in speed between the fastest group of hard disks and the others. The 11MB Folder Duplicate test (left segment) does not show as great a percentage speed difference in drives because copying many small files (average 40K in size) involves some overhead—for instance, the Finder's file directory must locate the files, and the drive's heads must move some. Likewise, the Open PageMaker test (right segment) has overhead since PageMaker must open several files in order to run.

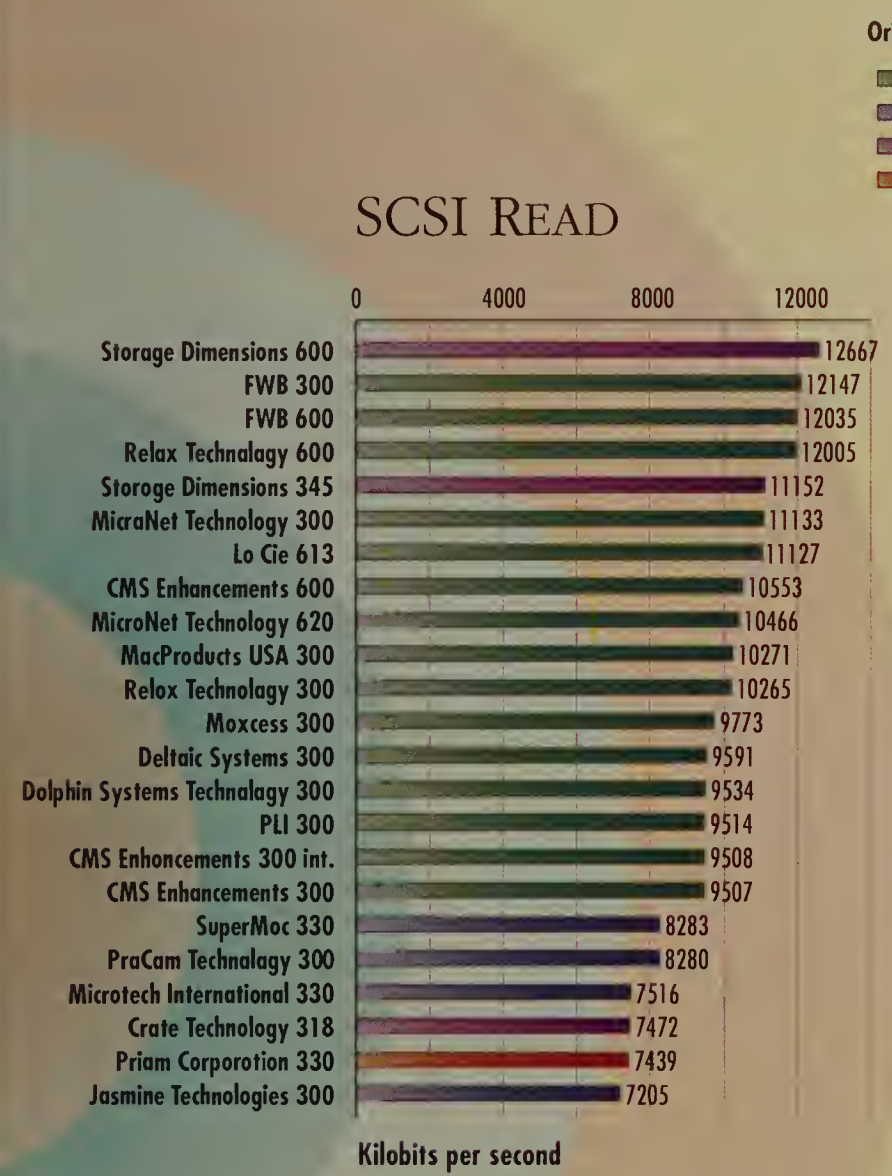
Database Search In a random access chore, such as a database search or file-server query, there was only about a 7 percent speed increase for the fastest group of drives. A read look-ahead cache is not very effective during random accesses, so the speed difference is attributable to more optimized drivers.

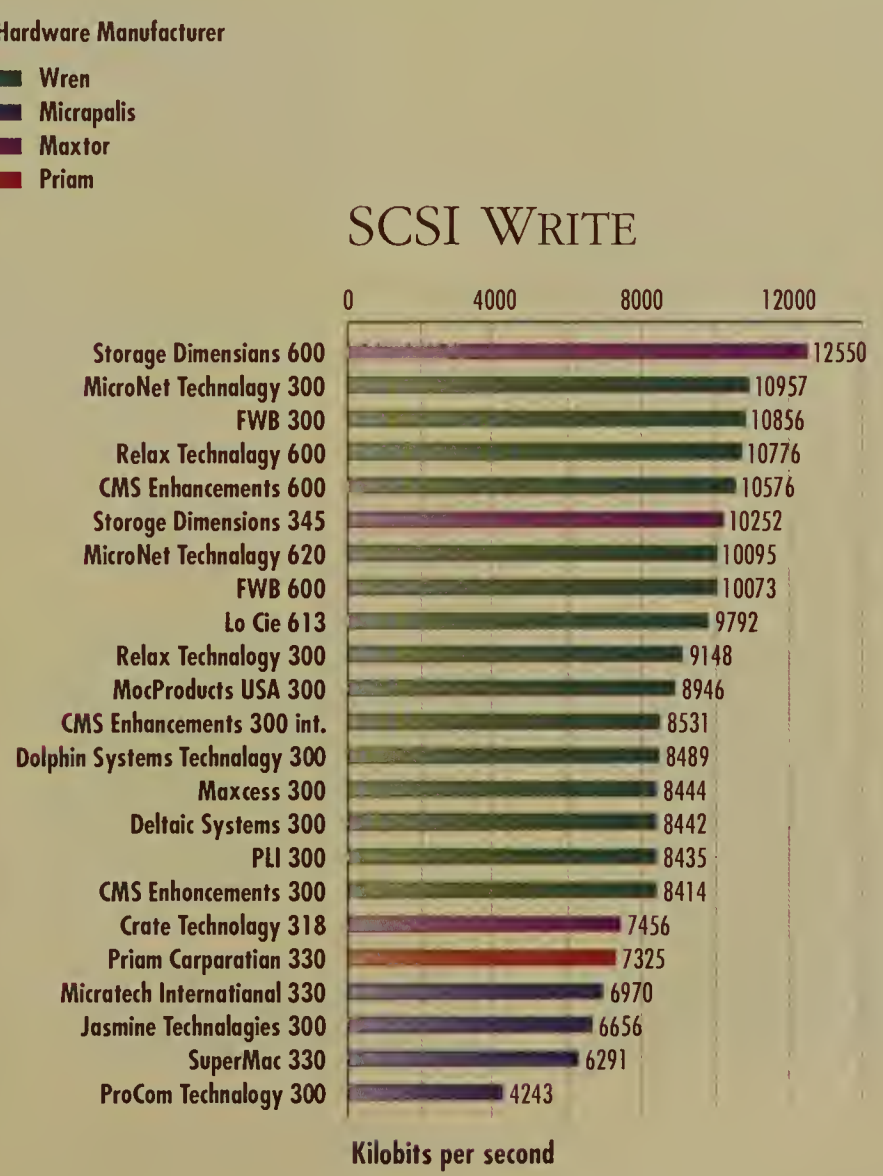
ters (embedded servo) or use no servo information (open loop). When a disk platter is dedicated to containing servo information, the hard disk has a better hit rate—that is, it takes fewer retries to find data. The fewer the retries, the faster the data access rate.

Speed is a significant issue with high-capacity hard disks because they are used for more demanding applications than, say, 100MB hard disks. Real-time sound and animation applications not only require lots of disk space, but they must also run on fast systems—you don't want the hard disk to become a bottleneck. Networks, too, require speedy disk access. The faster a hard disk can grant one data request, the faster it can move on to the next one.

While you can attach any external high-capacity hard disk to any Mac with a SCSI port, you risk sacrificing the drive's speed advantage. All of the hard disks Macworld Labs tested can read and write data much faster than a Mac Plus's SCSI port can transfer it (see "SCSI Port Transfer"). Although you still get some advantage from the faster access times when using a high-capacity hard disk on a Mac Plus, you don't see the same overall system improvement that you would on a Mac II.

Hard numbers also imply that the Mac SE's SCSI port cannot keep up with these hard disks. But this





SCSI Read Macworld Labs used SCSI Evaluator to test the amount of time a drive takes to read and write a large block of contiguous data. The smallest block of data transferred was 200K—large enough to negate the effect of a read look-ahead cache. In comparison to the application benchmarks, the Wren and Maxtor units performed as expected. The Micropolis-based hard disks, such as SuperMac's DataFrame XP 330, showed a lot of degradation. The Micropolis units do not use zoned-bit recording and were, therefore, at a disadvantage when tested on a newly formatted hard disk with only the outermost tracks full (see "Zoned-Bit Recording").

SCSI Write We then partitioned a 600MB hard disk that uses zoned-bit recording into five 96MB partitions. Read and write tests ran at about 10,500 kilobits per second on each of the four outermost partitions. The two innermost partitions transferred data 1500 to 2000 kilobits per second slower—that is, at about the same rate as the Micropolis-based units. Still, hard disks that use zoned-bit recording will be faster on average when transferring very large files.

assumes that a hard disk is performing constant, sequential accesses. If you use a hard disk for lots of random access chores, such as database queries, grabbing scattered files from a file server, or program compiling, then the hard disk will slow down because of simple mechanics; the heads must move over a larger space, and the interleave may cause even further delay. In these situations, a Mac SE may actually be a good match for a high-capacity hard disk. But if you want to be sure that the Mac is not a bottleneck, you'll want to use one with a 68020 or 68030 processor.

Reliability

Products that push the limits of current technology, such as high-capacity hard disks, often do so at the risk of reliability. A higher than normal percentage of hard disks tested did not run correctly at first. Hard disks from SuperMac, CMS, Dolphin, and Relax wouldn't run, and we had to exchange them. FWB's hammer600 wouldn't run as a start-up device until a hardware problem was fixed. And La Cie's Cirrus 613 never would run as a start-up device when attached to a Mac with an internal hard drive. Make sure the company or dealer you purchase the hard disk from offers a good warranty, service, and prompt exchange of a defective hard disk.

The reliability of connectors is an issue if you frequently detach and reattach an external hard disk. The 25-pin connectors have an insertion rating of only 250 times. By contrast, 50-pin connectors have an insertion rating of 2500 times—that is, you can plug and unplug them an awful lot before you risk wearing them out. The 50-pin connectors also have a ground for each data line, making them less susceptible to cable noise.

Although hardware reliability was often troubling, the accompanying software was more reliable. Only the MacProducts and Relax units, which use the same driver, had serious problems. The MacProducts hard disk stopped in the midst of duplicating an 11MB folder and we had to reformat it twice to get it to work. The Relax hard disk had the same problem, until we installed the AppleShare DeskTop Manager. A few days later we reformatted the Relax hard disk and tried to duplicate the problem but everything worked. A while later we received new software that did not produce the duplication error.

The other software problems we encountered were not serious. FWB's software brought up Apple's debugging window when we tried to name the hard disk after formatting it. Priam's software, although bug free, was extremely confusing to use, forcing us to experiment before we could figure out how to format the hard disk correctly.

The Software Partition

Even if a hard disk has clumsy software, you can be a little forgiving as long as it offers the features you need to get up and running. The higher the capacity of the hard disk, the more important it is to have partitioning software. Partitioning software lets you divide a hard disk into volumes, each of which acts like a separate hard disk.

Not only does partitioning keep you from running up against the System's limit of 2000 or so items on the Desktop, but it also helps to decrease the amount of time the Finder takes to update the desktop. System 7.0 promises to fix these problems, but still, partitions offer a handy way to keep 300MB worth of data organized. Partitions also help keep RAM requirements down. The System sets aside RAM for the Desktop file which keeps a directory of all the files on the disk; the RAM, however, is used only when the volume containing the files is active. On a network, partitions allow users to mount only the data they need, and they also allow the network administrator to restrict access to classified data without locking users out of the entire hard disk.

SCSI Port Transfer Rates

	SCSI Port Transfer Rates Kilobytes/Sec.	SCSI Port Transfer Rates Kilobits/Sec.	Slowest High-Capacity Drive Read/Write (Kilobits/Sec.)	Fastest High-Capacity Drive Read/Write (Kilobits/Sec.)
Plus	263	2693		
SE	656	6717	8283/6291	
SE/30, II, IIx, IIcx	1433	11,469	8283/6291	12,667/12,550

The speed of a high-capacity hard disk will only make a difference if you attach it to a Mac SE or Mac II series computer. The overall slowest high-capacity unit we tested can read data faster than an SE can transfer it, but it can't write faster. The overall fastest hard disk we tested can read and write data faster than even a Mac IIx can transfer it. How, then, were we able to measure the speed of the fastest hard disk? The SCSI port transfer rates you see are based on Apple's conservative rating. The SCSI chip manufacturer, however, rates the chip at 1.5MB per second (12,288 kilobits per second) with a potential rate of 1.6MB per second (13,107 kilobits per second). Using this rating, even the fastest hard disk is still a bit slower than the SCSI chip.

Products that push the limits of technology often do so at the risk of reliability

FINDING THE 20 PERCENT DIFFERENCE

Sometimes I really have to wonder if some of the leading edge Macintosh companies are asleep at the wheel.

In several of the Macworld Labs benchmark tests, one group of hard disks ran 20 percent faster (or more, depending on the test) than any of the other hard disks. Anytime I see a speed difference that large, I wonder what's going on—and you should, too. A 5 percent speed difference could be the result of driver software; most vendors use Apple's generic driver as a base, and then tweak it to squeeze out performance.

But 20 percent is something else. A vendor could be taking a shortcut, such as bypassing the ROM and going directly to the SCSI chip. This can be a problem if Apple releases a new version of system software that renders the driver incompatible or if you are using an accelerator board.

A shortcut isn't the answer in this case, however. It's a matter of who's been paying attention in class. You see, most hard disk vendors use Imprimis's Wren hard disks, which offer a read look-ahead cache. This cache looks ahead of the current access and reads 32K of information (a whole track) into the hard disk controller's RAM. Unfortunately for many vendors, Imprimis's Wren hard disks come with the cache disabled. The vendor must write a simple bit of code to enable it. Micropolis drives, such as the one used in SuperMac's DataFrame XP 330, also use a read look-ahead cache, but Micropolis enables it for the vendor.

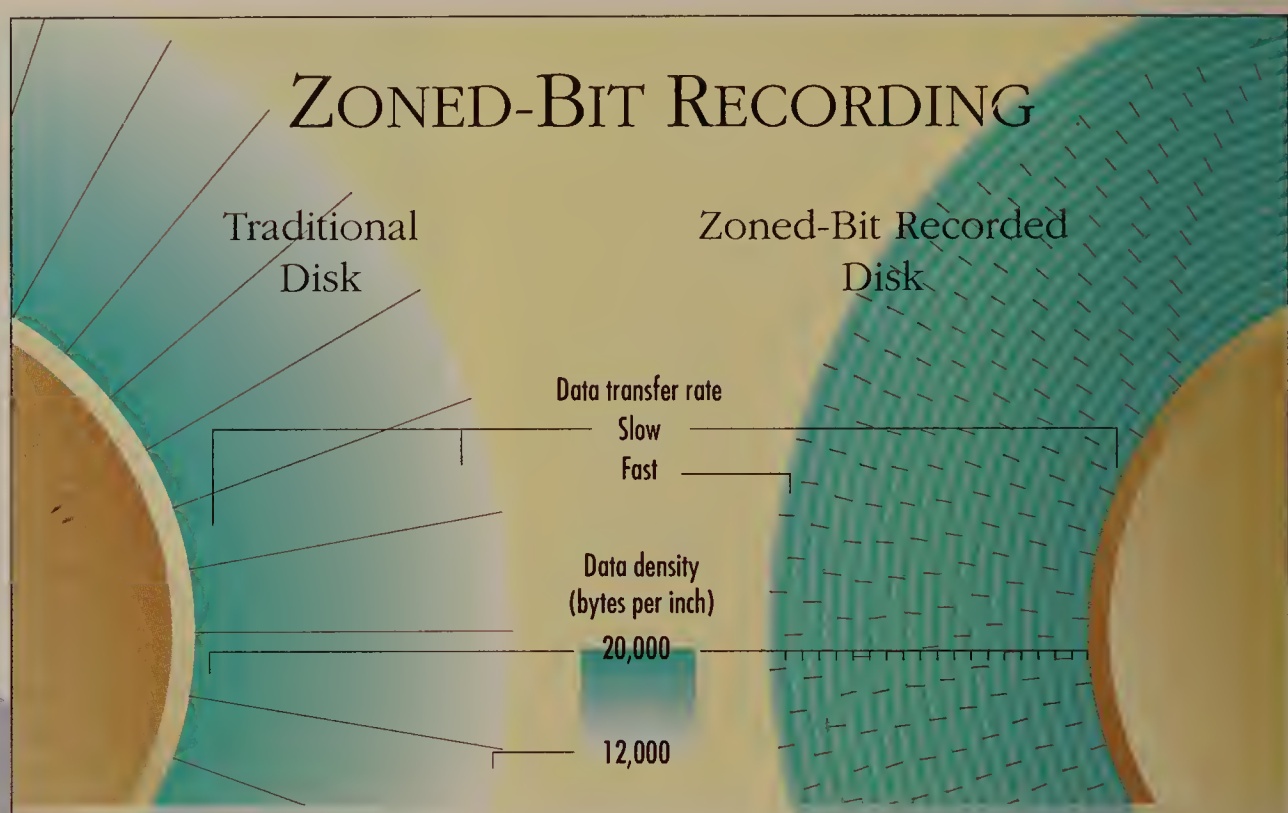
A read look-ahead cache easily makes sequential access tasks, such as copying small continuous files from a server, at least 20 percent faster. For instance, when I first asked Dolphin Systems whether or not the company enabled the read look-ahead cache, the spokesperson didn't know that the Wren drives supported one. A few days later I received a new version of the driver, which enabled the cache. The result? On the benchmark tests where the cache is effective, the Dolphin units catapulted from being average to being among the fastest drives.

Two types of partitioning are available—hard and soft. Hard partitioning, or true SCSI partitioning, works the way its name implies—the partitioning information is written directly on the hard disk and on the System. With hard partitioning you can have multiple operating systems, such as older versions of the System, Kanji, or A/UX in different partitions on the same hard disk, and you can select which partition to start up from. You can't, however, resize partitions without reformatting the hard disk and losing data.

Soft partitioning, on the other hand, lets you resize partitions without harming data. This is possible since soft partitions emulate true SCSI partitioning by fooling the Finder with an invisible file on the hard disk. The data on the hard disk is still essentially one big file, so you can't have multiple operating systems. The biggest problem with soft partitioning is that if the hard disk crashes, you lose all of the data on it—this is especially harmful on a network where many users' ability to work depends on having access to the file server. With hard partitioning, you would only lose the data on the volume where the crash occurred.

Only one company, La Cie, has a hard partitioning utility that also lets you resize partitions without losing data. If you want to resize a partition, the software copies the data from the disk and moves it to a new physical location. You can lose data if the new partition is smaller than the amount of data you want to store in it. La Cie's software, however, gives you a dialog box that compares the amount of data stored in the old partition with the amount of space in the new partition, giving you a chance to cancel the operation if the new partition is too small.

Partitioning and security software are important—floppy drive backup software isn't



On a traditional disk, the inside tracks are crammed with as many 512-byte sectors as possible. Outer tracks maintain the same number of sectors even though they are up to 70 percent longer, which makes them less dense. In zoned-bit recording, the number of sectors per track increases as the tracks grow larger. Thus, the outer tracks have the same density as the inner tracks, but a faster data-transfer rate. For instance, Imprimis's Wren hard disks transfer data at the rate of 15 megabits per second on the outer tracks, but only 9 megabits per second on the inner tracks. A Micropolis hard disk, using standard technology, transfers data at a constant 10 megabits per second. Imprimis is set to introduce a 1.2-gigabyte, 5¼-inch, full-height hard disk that will use zoned-bit recording.

Some hard disks do not include partitioning software. MacProducts believes that third-party software such as AlSoft's MultiDisk is better than anything a hard disk vendor can provide. Still, I was satisfied with the partitioning software included with the hard disks reviewed here. To buy a hard disk and not have the software you need to set it up right the first day is a lot like getting a toy without any batteries at Christmas.

Except for the Dolphin, PLI (Peripheral Land), and SuperMac hard disks, which limit you to four, six, and nine partitions respectively, products with partitioning software let you create as many partitions as anyone realistically needs. Most hard disks also come with utility software for mounting and unmounting partitions. Some, such as Storage Dimensions, FWB, and PLI, let you mount a hard disk via a handy CDEV or desk accessory. Shareware packages such as MountEm and SCSI Tools also let you mount and unmount volumes.

Since high-capacity hard disks are frequently used as file servers, protection from unauthorized access and from virus infection is a serious issue. Several hard disks offer password protection for either the whole hard disk or, if the hard disk supports partitioning, for each volume. Since you can still look at the data on a password-protected volume using Fedit, SuperMac has gone one step further and included software for encrypting files. MacProducts and CMS hard disks also come with virus-protection shareware.

Backing Up All That Data

While partitioning and security software is important, floppy drive backup software isn't. Backing up 300MB or more of data onto 800K floppies isn't the most efficient way to ensure data safety. A tape drive, a second hard disk, or a removable cartridge drive are superior alternatives because these products are designed to handle large amounts of data. Most hard disk vendors also make tape drives that you can purchase at the same time you buy a hard disk.

MicroNet's Micro/Max SBX series of hard disks provide a cabinet that can house a high-capacity hard disk as well as a 60MB or 150MB tape backup unit. Several other companies, such as CMS and MacProd-

SEVEN TOP DRIVES

Here are *Macworld*'s favorite high-capacity hard disks, in order of preference.

Storage Dimensions Storage Dimensions gets its hard disks directly from its parent company, Maxtor, giving it an advantoge when replacing or servicing hard disks. These hard disks gave us no problems, they're quiet, and everything from the design to the manuals to the software is very well thought out.

SuperMac A longtime player in the Mac storage arena, SuperMac's hard disk is one of the fastest we tested. The software provides all the necessary features plus a few more. The interface is the best you'll find, and the manual is very clear.

MicroNet A company on the move, MicroNet is constantly adding new features to its already-excellent software. Drives are well designed, and you can purchase a service contract that extends the warranty to two years and guarantees overnight replacement for damaged hard disks.

FWB A specialist in high-capacity hard disks, FWB has fast, quiet, well-designed hard disks that offer more formatted capacity than any other Imprimis-based hard disks. The security and partitioning software is a special plus.

Maxcess Excellent software (the same as FWB's), a two-year warranty, and a 48-hour repair turnaround time (including return of your dato) are enough by themselves to push these hard disks onto the top-picks list. Being one of the fastest hard disks doesn't hurt either.

Deltaic Deltoic is a new kid on the block, but it found the read look-ahead cache in the Wren hard disk, something larger, more-estoblished companies missed. Look for more innovation in the future.

PLI Although these hard disks weren't the fastest we tested, they do come with TurboCache caching software, which, when tweaked, produced up to a 10 percent speed increase. You also get the other software in PLI's Turbo series—disk optimizer, laser printer spooler, and backup utility.

Storage Dimensions

SuperMac

MicroNet

FWB

— 408-879 0300

— 215-386 2208

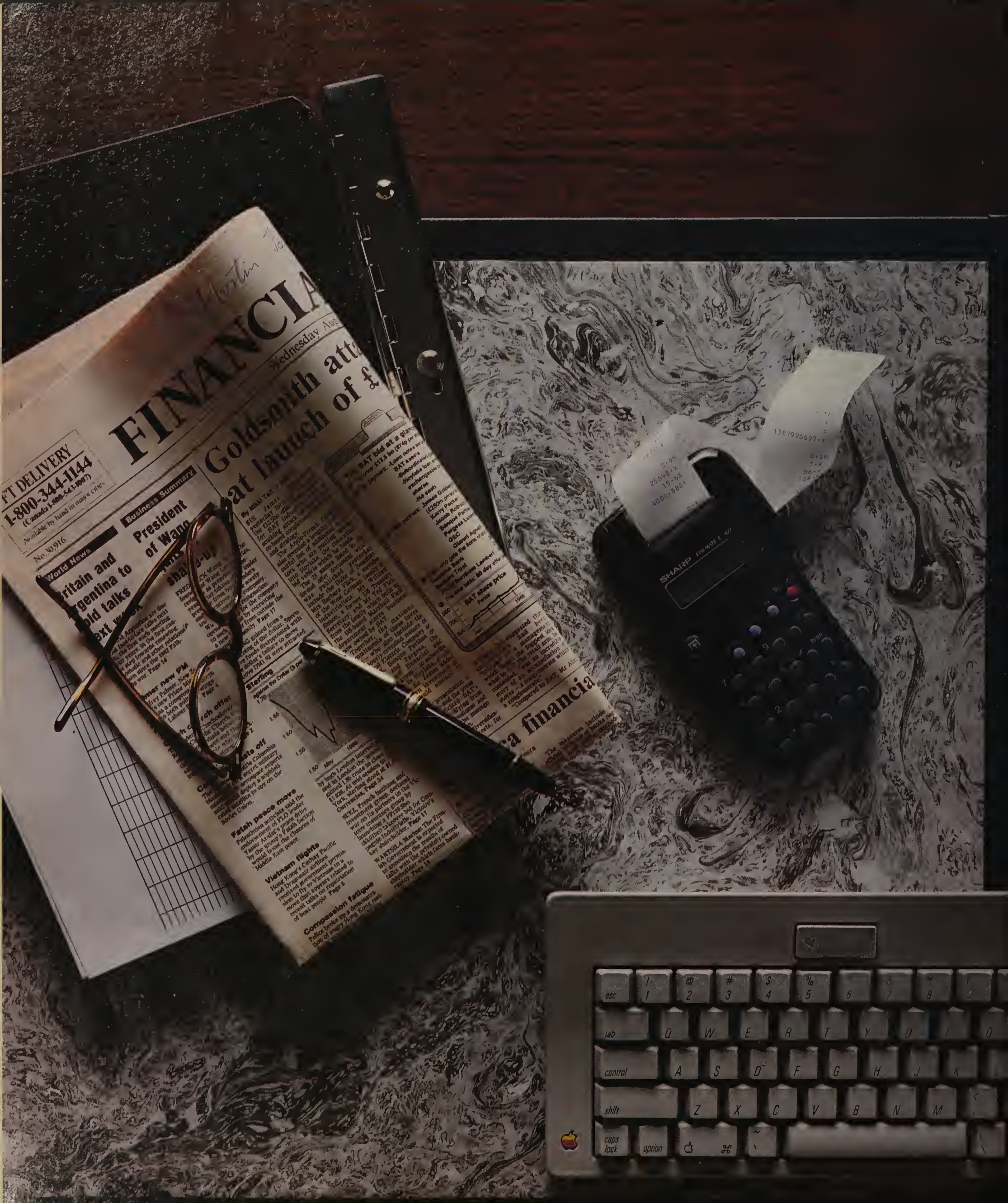
— 408-954-1055

ucts, offer large, floor-standing cabinets that can hold custom configured combinations of hard disks, tape drives, optical drives, and removable drives. Northern Telecom provides a system that combines a whopping 940MB of hard disk capacity with 2.3 gigabytes of tape backup.

The Big Easy

A high-capacity hard disk is a joy to own and use. But these hard disks are expensive and, based on our experience, they're more prone to problems than lower-capacity hard disks. You'll want to make sure that you purchase a hard disk from a reputable, responsive company. The hard disk should also include the basic software, such as partitioning or password protection, that you need to get up and running. Once you make your choice, you'll have a chance to appreciate the comfort that comes with having so much storage space to work with. I can only imagine that this is what it feels like to move into a mansion after living in a one-bedroom apartment. ■

See *Where to Buy* for contact information.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DESK ACCESSARIES BY MARK CROSS

PIERRE YVES GOAVEC

A Full Accounting

Finding the right accounting package

BY ALAN L. SLAY

Deep down, everyone knows that automated bookkeeping brings numerous advantages: electronic accounting systems are efficient and accurate, and they allow instant access to transaction records. Yet, according to a recent study by Bis Cap International, nearly 47 percent of small businesses in the United States have not yet computerized.

Two commonly stated reasons for not automating are "My business isn't big enough" and "I can't afford it." If your business has just a few employees and you write a dozen or fewer checks per week, there's probably no great reason to automate. I do, however, know of some businesses this size that have automated just so they can produce instant reports. But if you can't justify spending about $150 per month (the purchase price amortized over two years), then you're right in thinking you can't afford to automate.

Based on my experience with small businesses, however, I've found that much of the reluctance to computerize results not from cost considerations but from a fear of computers and the demanding learning curve required for accounting programs. These concerns may be justified in the mainframe, minicomputer, and MS-DOS worlds, but certainly not on the Macintosh. For instance, on the Mac, charts of accounts and lists of customers and vendors appear in pop-up windows—in English. Bookkeeping consists of just pointing and clicking with a mouse and entering basic information. And you'll find the hotlines maintained by the various

publishers extremely helpful to the beginning user.

Once you overcome your initial apprehension, you'll need to pick out an appropriate program. I'll explain the features and benefits of the various types of accounting programs and recommend a few that particularly impressed me.

One-Write Programs

If you are dealing with a fairly small business, consider a one-write accounting program. These are electronic versions of manual one-write systems that let you create a carbon-copy accounting record at the same time you write checks and make deposits. With a computerized system, however, you'll also be able to view or print reports that tell you exactly how the business is doing as of that day. A one-write program takes up very little of your time (so you can still devote most of your attention to business), and at the same time provides both you and your accountant with timely and accurate information.

Both of the one-write programs I reviewed, Layered's Insight OneWrite and Great Plains' Plains and Simple One-Write, are excellent programs from reputable companies, and both are designed for simplicity and ease of use. When you write a check, for example, you enter the payee and the amount you're paying out of the checking account. You then enter the amount again under the expense category you're charging against, say repairs and maintenance. That's all there is to it.

General Accounting Programs

One step beyond one-write systems are general accounting programs. These programs are suitable for a wide range of users, from the small-business owner whose main interest is the business, not the accounting, to a full-time bookkeeper or bookkeeping group.

The owner of a small business who has little time to devote to bookkeeping will like the all-in-one programs that combine in a single program the general ledger, accounts payable, accounts receivable, and, depending on the product, other segments such as payroll.

The best examples of this type of program are Monogram's Business Sense and Computer Associates' (formerly Bedford) Simply Accounting, both of which place graphic icons of the journals on the Mac's desktop. If you want to enter deposits, for example, you merely click on the icon labeled Money into the Bank, and a Receipts journal appears on the screen ready for entries. Both programs offer a number of accounting features, and their reports should satisfy the needs of most small-business managers and their accountants.

Both business managers and bookkeepers should look at Chang Labs' Rags to Riches and CheckMark's MultiLedger. Rags to Riches has an excellent interface that lets you click into and out of different transaction cards quickly and easily. The program comes in separate modules that require you to pass data to the General Ledger through separate merge files. For instance, after posting Accounts Payable entries, you create a merge file, open the General Ledger, and merge those entries into it. This process is not difficult to learn, and in general working with these programs becomes fairly easy once you've gained a little experience.

MultiLedger includes General Ledger, Accounts Payable, and Accounts Receivable segments, as well as Inventory, which allows you to track inventory and sales commissions simultaneously. The program offers an attractive power-to-price ratio and is very easy to use. MultiLedger has some of the simplest and most logical menus and entry screens of all the programs I examined, and you'll never have to know the difference between a debit

MULTIUSER FEATURES

Multiuser versions have different costs and different requirements than single-user versions. Here's the scoop on multiuser versions.

A4
Cost: $2000 (unlimited users) plus cost of one copy of 4th Dimension
Networks supported: AppleShare, TOPS, Ethernet, 3Com, Novell
Maximum concurrent users: 3–18, depending on the network

FLEXWARE
Cost: $795 per module
Networks supported: AppleShare, TOPS, Macserver
Maximum concurrent users: 99

GREAT PLAINS ACCOUNTING SERIES
Cost: $795 for separate Network Manager Module
Networks supported: AppleShare, TOPS
Maximum concurrent users: No limit

INSIGHT EXPERT ACCOUNTING
Cost: $895 per module
Networks supported: AppleShare, TOPS
Maximum concurrent users: 16

MULTI-USER DESKTOP ACCOUNTING
Cost: $3995 for G/L, A/R, A/P, Billing
$4795 for G/L, A/R, A/P, Inventory, Purchasing, Order Entry, Invoicing with Point-of-Sale
Networks supported: AppleShare, TOPS, 3Com, DEC-Serve
Maximum concurrent users: 20

SBT MAC SERIES SIX PLUS
Cost: $595 per module plus cost of FoxBase+/Mac
Networks supported: AppleShare, Novell, 3Com
Maximum concurrent users: Limited by network

WOS FUND ACCOUNTING
Cost: Combinations of modules to $5995 plus cost of WOS Database for data storage and reports
Networks supported: AppleShare, TOPS, Corvus Omninet
Maximum concurrent users: 45

and a credit unless you want to. The program also offers a reasonably full set of accounting capabilities that should appeal to bookkeeping-wise users.

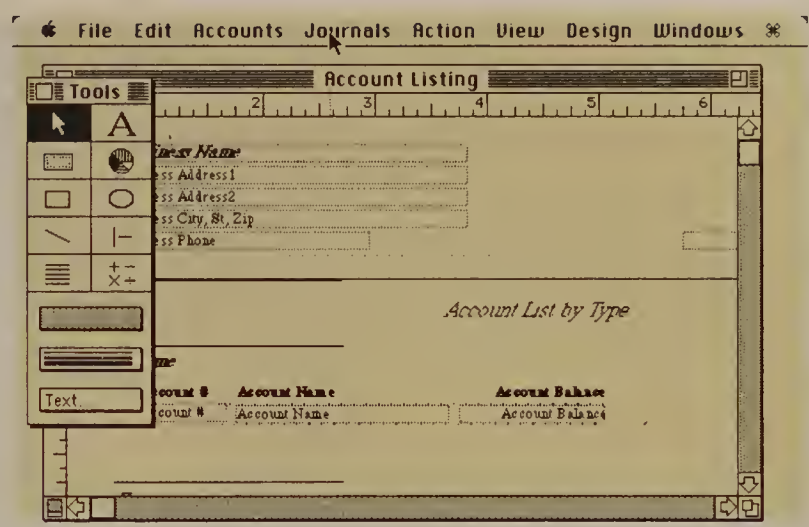
Another of MultiLedger's great strengths is its optional, easy-to-use Payroll program, which posts checks and data directly to the main accounting program, thus eliminating the need to manually enter data. CheckMark's Payroll program is also excellent for businesses whose

MultiLedger has the most logical menus and entry screens

employees work different hours each pay period. All the hours can be entered quickly on a single screen; other payroll programs require you to enter hours for each employee separately. MultiLedger also offers flexible report formatting. For example, you can pull an income statement for March, April, and May and compare it with the statements from the previous year.

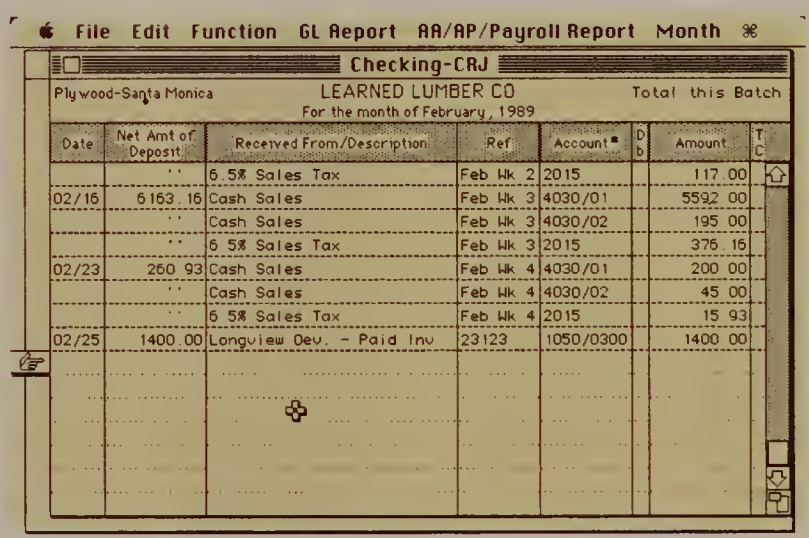
Satori's Components General Ledger, the first module of a promised series of object-oriented programs built around the Macintosh interface, lets you customize accounting ledgers and reports by combining various components (or objects). You can, for example, tailor-make a journal, or build a report with selected accounts, illustrations, and graphs. Components General Ledger links with data from Satori's Legal Billing II, and Project Billing packages, Shopkeeper's Point-of-Sale package, and Aatrix's Payroll Plus program.

Pro Plus Software's Pro Pac is a conventional, if unexciting, general accounting program that includes General Ledger, Accounts Receivable, Accounts Payable, and Inventory Control modules. Like an MS-DOS program, Pro Plus Accounting is text oriented, and therefore makes sparse use of icons and graphics, and its ability to customize reports is limited. The program does, however, print bar and pie graphs, and it offers a set of basic reports such as balance sheet, income statement, trial balance, and aged accounts payable and accounts receivable. It also performs payment calculations and loan amortizations. Pro Plus plans to expand Pro Pac's features so that it competes with high-end, multiuser packages. In its present single-user, multimodule configuration, however, Pro Pac is similar to Rags to Riches, but with a much more staid interface and a much higher price.



Components
Satori's Components General Ledger provides a tool box for creating custom graphics. The program also imports and exports graphics and prints reports on a PostScript printer.

Two programs that follow standard accounting practices, Absolute Solutions' Computerized Classic Bookkeeping and Layered's atOnce, will appeal to managers and full-time bookkeepers with bookkeeping savvy. Computerized Classic Bookkeeping is a full-featured accounting program that runs under Microsoft Excel. It closely resembles manual bookkeeping journals and ledgers, and it also contains a wide range of customized reports and graphs designed to enhance the traditional bookkeeping environment.



Business Sense
This is the electronic journal Business Sense shows you when you click on the Money into the Bank icon. Business Sense works in real time, so after you enter deposits and close the window, your entries are immediately posted in the General Ledger.

AtOnce consists of General Ledger, Accounts Receivable, Accounts Payable, and Payroll programs. It offers features not found in other general accounting programs, such as automatic reversals and fully customized reports. It also comes bundled with a HyperCard tutorial, along with complete, well-written documentation, which should help to shorten the learning curve for those users who want to learn standard bookkeeping procedures and the program at the same time.

General Accounting Program Recommendations

If you don't want to spend more than a few hours per week keeping the books, I recommend that you consider, along with the one-writes, Simply Accounting, Business Sense, and MultiLedger. Working managers will like MultiLedger's simplicity, and bookkeepers will like its fairly full set of accounting features. The integrated Payroll program is an added advantage. Bookkeepers and those managers with the time to follow conventional accounting practices should look at Rags to Riches and atOnce. Of the two programs, I strongly prefer atOnce for its ease-of-use and wide range of excellent features.

Specialized Applications

If you bill on a per-job basis (as a repair shop might do), you should look at Peachtree's Back to Basics Professional and Brown/Wagh Publishing's Service Industry Accounting. Back to Basics Professional has been reshaped from a gen-

ACCOUNTING PROGRAM DETAILS

	ONE-WRITE PROGRAMS						GENERAL ACCOUNTING PROGRAMS		
	Insight OneWrite	Plains & Simple One-Write	atOnce	Back to Basics Professional	BPI Entry Series Accounting	Business Sense	Components General Ledger	Computerized Classic Bookkeeping	MultiLedger
Company	Layered	Great Plains Software	Layered	Peachtree Software	Computer Associates International	Monogram Software	Satori Software	Absolute Solutions	CheckMark Software
Price	$125	$395	$395	$199	$89	$495	$595	$395	$395
Additional database required								•	
Maximum departments/profit centers[4]	99	1	100/100	10	10	99	ld	ld	9
Help screens		•	•	•		•	•		
Length of free telephone support (in days)	30	30	30	0	60	45	0	90	unlimited
Toll-free support included		•							
Budgeting capability	•		•			•	•	•	•
GENERAL LEDGER									
Maximum # of transactions	ld	ld	ld	4500	ld	ld	ld	lm, ld	ld, lm
Maximum # of bank accounts	1	ld	20	3	5	5	ld	60	ld, lm
Chart of accounts									
sample set provided	•	•	•[1]	•	•	•	•	•	•
maximum # of accounts	58	ld	ld	245	8000	2000	ld	ld	ld, lm
alpha/numeric	n	n	n	n	n	n	n	n	a, n
Processing method	b	r	r	b	r	r	b	b	r
Automatic reversals		•	•		•	•			
Direct disbursements (from G/L)				•		•			•
Flexible fiscal periods	•		•	•	•	•	•	•	•
Enter future transactions (current year)	•	•	•			•	•	•	•
Enter prior-period transactions	•	•	if open			•	•	•	•
Recurring/automatic entries		•	•	•	•	•	•	•	•
Reconcile checking account on screen	•	•							•
Reports									
screen, disk, graphs	s, d	s	s, d	s, d	s, d	s, d, g	s, d, g	s, d, g	s, d, g
trial balance	•	•	•	•	•	•	•	•	•
balance sheet, income statement	•	•	•	•	•	•	•	•	•
transaction journals	•	•	•	•	•	•	•	•	•
forecasts								•	
ratios, interpretations									
custom	•		•				•	•	•
ACCOUNTS PAYABLE							n/a		
Maximum vendors	ld	ld	ld	115	2000	2000		ld	ld, lm
Maximum transactions	ld	ld	ld	1200	ld	ld		lm, ld	ld, lm
Enter prior-dated invoices	•	•	•	•	•	•		•	•
Recurring/automatic transactions			•		•	•		•	•
Stores transactions by					n/a				
invoice number			•	•				•	vendor
assigned document number	•	vendor	•					•	•
date	•		•			•		•	•

a = alpha; b = batch; d = disk; g = graphs; ld = limited by disk space; lm = limited by memory; n = numeric; r = real time; s = screen

[1] Separate module. All packages offer a choice of either cash or accrual accounting methods, unless otherwise indicated in the Comments section.

[2] For single-user modules: $1195 for G/L, A/R, A/P, Billing; $1795 for G/L, A/R, A/P, Inventory, Purchasing, Order Entry and Invoicing. For multiuser information, see "Multiuser Features."

						MULTIUSER ACCOUNTING PROGRAMS				
Pro Pac	Rags to Riches	Service Industry Accounting	Simply Accounting	a4	Flexware	Great Plains Accounting Series	Insight Expert Accounting	Multi-User Desktop Accounting	SBT Mac Series Six Plus	WOS Fund Accounting
Pro Plus Software	Chang Labs	Brown/Wagh Publishing	Computer Associates	Saftek Design	Micrafinancial Corporation	Great Plains	Layered	Logisoft	SBT Corporation	Farallon Computing
$995	$499.95	$395	$349	$2000[5]	$795/module[5]	$795/module[5]	$695/module[5]	[2]	$495/module[5]	to $1695[6]
				•					•	•
unlimited	99	1	1000	ld	99	999/36	999/256	33	99/999	ld
•	•	•	•		•	•	•			•
30	90	0	60	14 months	0	30	30	0	unlimited	0
	•					•	•			
•		•			•	•	•	•	•	•
ld	lm	ld	lm	ld	ld	ld	ld	ld	ld	ld
ld	ld	ld	ld	ld	ld, lm	ld	ld	5	[1]	ld
	•	•	•	•	•	•	•	•	•	•
ld	ld	ld	lm	ld	99,999	ld	ld	ld	99,999	ld
a, n	a, n	a, n	n	a, n	n	a, n	n	a, n	o, n	a, n
r	b	r	r	b	r, b	b	b	b	b	r
•					•	•	•	•	•	•
		•		•				•		
	•	•	•	•	•	•	•	•	•	•
•	•	•		[3]	•	•	•	•	•	•
•	•	•	•	[3]	•	•	•	•	•	•
•	•				•	•	•	•	•	
•	•			•	•	•		•		
s, d, g	s, d	s, d	s, d	s, g	s, d	s, d	s, d, g	s, d	s, d	s, d
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	•					[1]	•	•	•	
•			•	•	•	[1]	•	•	•	[1]
ld	ld	ld	lm	ld	ld	ld	ld	ld	ld	ld
ld	lm	ld	lm	ld	ld, lm	ld	ld	ld	16 million	ld
•	•	•	•	[3]	•	•	•	•	•	•
•					•	•	•	•	•	
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	•	•		•		•	•	•		
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[3] *Maximum two years open at once.*

[4] *Where only one number is given, the program offers up to that number of either departments or profit centers.*

[5] *Price is for single user modules. For multiuser information, see "Multiuser Features."* [6] *General ledger only.*

ACCOUNTING PROGRAM DETAILS (continued)

	ONE-WRITE PROGRAMS						GENERAL ACCOUNTING PROGRAMS		
	Insight OneWrite	Plains & Simple One-Write	otOnce	Back to Basics Professional	BPI Entry Series Accounting	Business Sense	Components General Ledger	Computerized Classic Bookkeeping	MultiLedger
Company	Layered	Great Plains	Layered	Peachtree Software	Computer Associates International	Monogram Software	Satori Software	Absolute Solutions	CheckMark Software
ACCOUNTS PAYABLE (continued)									
Allows one-time vendors	•		•	•		•		•	•
Carries over unpaid invoices		•	•	•	•	•		•	•
Batches invoices for payment		•	•	•	•	•		•	•
Calculates discount	•		•	•		•		•	•
Allows memos on checks		•	•						•
Reports					n/a				
screen, disk, graphs		s	s, d	s, d		s, d, g		s, d, g	s, d, g
detailed yr.-to-date vendor transactions		•	•	•		•		•	•
aged A/P		•	•	•		•		•	•
custom			•					•	flexible format
Prints mailing labels		•	•	•		•			•
ACCOUNTS RECEIVABLE							n/a		
Maximum # of customers	ld	ld	ld	400	2000	2000		lm, ld	ld, lm
Maximum # of transactions	ld	ld	ld	2000	ld	ld		ld	ld, lm
Enter prior-dated invoice	•	•	if open		•	•		•	•
Recurring/automatic transactions			•			•		•	•
Calculates finance charges			•	•		•			
Customer credit limits		•	•	•		•		•	
Tracks by salesperson						•		•	•
Tracks sales commission						•			•
Separate bill to/ship to			•	•		•			•
Reports					n/a				
screen, disk, graphs	s	s	s, d	s, d		s, d, g		s, d, g	s, d, g
detailed yr.-to-date customer transactions	•	•	•	•		•		•	•
aged A/R	•	•	•	•		•		•	•
customer invoices	•		•	•		•		•	•
customer statement	•	•	•	•		•		•	•
custom			•					•	flexible format
Prints mailing labels	•		•			•			•
Prints dunning message			•	•					•
OTHER MODULES INCLUDED	n/a	n/a	payroll		payroll	payroll, job costing			inventory
OPTIONAL MODULES	n/a	n/a						inventory, graphics, job costing, forecasting	payroll
COMMENTS	cash method			balance forward in A/R					

a = alpha; b = batch; d = disk; g = graphs; ld = limited by disk space; lm = limited by memory; n = numeric; r = real time; s = screen

See Footnotes 1-6 on preceding page

MULTIUSER ACCOUNTING PROGRAMS

Pro Poc	Rags to Riches	Service Industry Accounting	Simply Accounting	a4	Flexware	Great Ploins Accounting Series	Insight Expert Accounting	Multi-User Desktap Accaunting	SBT Mac Series Six Plus	WOS Fund Accaunting
Pro Plus Softwore	Chang Lobs	Brown/Wogh Publishing	Computer Associotes	Softek Design	Microfinoncial Corporotion	Greot Ploins	Loyered	Logisoft	SBT Corporation	Forallon Computing
	•	•	•	•		•	•	•	•	
•	•	•	•	•	•	•	•	•	•	•
•	•	•		•	•	•	•	•	•	•
•	•	•		•	•	•	•	•	•	•
	•	•		•	•	•		•		•
s, d	s, d	s, d	s, d	s, g	s, d	s, d	s, d, g	s,d	s, d	s, d
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•	•	•		•	•	•	•	•	•	
				•	•	ı	•	•	•	ı
•	•	•		•			•	•	•	ı
ld	ld	ld	lm	ld	ld	ld	ld	ld	16 million	ld
ld	lm	ld	lm	ld	ld, lm	ld	ld	ld	ld	ld
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•	•	•	•	•	•	•	•	•	•	•
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	•			•	•		•	•	•	
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•					•	•	•	•		
•	•	•	•	•	•	•	•	•	•	
s, d	s, d	s, d	s, d	s, g	s, d	s, d	s, d, g	s, d	s, d	s, d
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•	•	•	•	•	•	•	•	•	•	•
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•	•	•	•	•	•	•	•	•	•	•
•				•	•	ı	•	•	•	ı
•	•	•		•	•	•	•	•	•	ı
	•	•		omts. due by oging period				•	•	
general ledger, A/R, A/P, inventory control		inventory	inventory, job costing	inventory ond order entry, invoicing						
	professionol billing				soles onolysis, order processing, inventory, purchosing, poy-roll, job costing	poyroll, inventory, reporting, job costing, order entry, purchase order, doto onolysis	poyroll, inventory, professionol billing		ledger, invoice/stote-ment; check with SBT for others	poyroll, purchase order/voucher, A/R, student billing
			accruol method					occruol method		

eral accounting program to a professional billing program and given an expanded invoicing segment. Back to Basics Professional uses a file cabinet metaphor: if you want to prepare an invoice, for instance, you click on the Invoice file drawer and an electronic invoice form appears on the screen ready for entries. If you like dealing with terms like *debit* and *credit,* you'll like the Back to Basics Professional program, which retains traditional terminology.

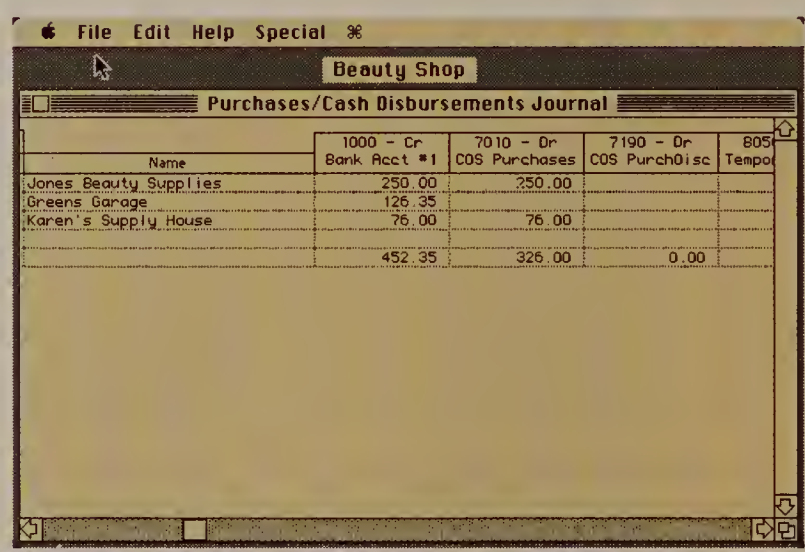
If you prefer to avoid all accounting terminology in your service billing, you'll like Service Industry Accounting. The program will not win any pole position in the Indy 500, but it takes a lively graphic approach to accounting that centers around your jobs. For instance, when you click on the Jobs icon, a Jobs book appears on screen, with alphabetical markers protruding from the pages. Click on the G–H marker, and the animated pages turn to that section; you can then look at detail and summary records by clicking on any of the job names that begin with the letters *G* through *H.*

Although you can modify a general accounting program for fund accounting, there's one product designed specifically for nonprofit organizations whose revenue comes from both private and government sources. WOS Fund Accounting, from Farallon Computing, emphasizes how a budget is spent, and lets you perform such specialized functions as billing students for tuition. This program is as powerful as any Macintosh accounting program and is able to function in a mixed Macintosh and MS-DOS multiuser environment.

Multiuser Programs

Multiuser programs are geared toward bigger businesses, or toward a network within a large company, where several people work on the system at the same time. The ledgers come in separate modules, each of which is usually priced higher than a complete all-in-one general accounting program. There's usually an extra charge for multiuser capability, such as an add-on cost per module. Multiuser programs generally follow standard accounting practices like batching entries, proofing them, posting them in the books, and printing out audit trails. This contrasts with most of the general accounting programs, which post entries immediately after they are entered in the journals.

Smaller businesses can also use single-user versions of the multiuser programs. The manager of a small business could, for example, use only an inventory module for tracking inventory, or an accounts receivable module for invoicing, and leave the rest of the bookkeeping to an accounting firm. Or the manager might use the billing module and then forward the data on disk to an accountant who uses the companion modules. A small business might also begin with a few modules—like general ledger and accounts receivable—and then gradually expand.



Plains and Simple
Plains & Simple One-Write lets you verify your account balances by entering sums paid out from the checking account under the expense category as well (top). As soon as items are posted, they appear throughout the variety of reports available in the program. Report types are represented by icons (bottom).

Many multiuser accounting programs for the Macintosh originated in the MS-DOS world. Microfinancial Corporation's Flexware, which provides connectivity to MS-DOS– and VAX-based systems, offers a complete set of modules covering most aspects of small and medium-size businesses. Great Plains Accounting Series is another program with MS-DOS roots that has been well adapted for the Mac. Great Plains offers easy-to-use data-entry screens, and prides itself on its client support. The program is geared to the full-time bookkeeper and follows traditional accounting practices.

SBT Corporation, which has offered a wide-ranging series of modules in both the MS-DOS and Mac environments for several years, recently released its SBT Mac Series Six Plus accounting set, which runs on the FoxBase+/Mac database. The series was formerly set in dBase; the new series not only runs much faster, it also sports a better Mac interface with pull-down menus and pop-up windows. You can purchase the Series Six Plus source code so that you can customize your modules. And, if you don't want to purchase FoxBase+/Mac separately, SBT will sell you a compiled program with a run-time version of the database program.

Three more multiuser programs, Logisoft's Multi-User Desktop Accounting (MDA), Layered's Insight Expert Accounting, and Softek Design's a4 are each designed around the Macintosh interface, and they make much better use of it than do the MS-DOS–originated programs.

MDA is built around an Omnis-3 database engine, a run-time version of which is supplied with the software. Any Mac user should feel comfortable with the very competent (though somewhat dull) Omnis interface, and MDA offers a good range of modules. Logisoft does not offer a payroll program that

CYNTHIA MOORE

Roy Johnston, the owner of Hardwood Center in Santa Ana, California, uses Great Plains' accounting modules in his retail building-supply business. Johnston runs Great Plains' multiuser modules on AppleShare, and uses the system for inventory control and point-of-purchase sales and billing, in addition to basic bookkeeping functions.

moves data directly to MDA, but a separate program, Software Bridges' Payroll Bridge, integrates with MDA's General Ledger. MDA also sells the Omnis source code, so the programs may be customized.

Layered's Insight Expert Accounting is a very polished and thoughtfully designed program that has been built around the Macintosh from the bottom up. Unlike MS-DOS–originated programs, it uses the Mac interface effectively by offering the user icons and palettes for choosing journals and ledgers. In the Accounts Payable ledger, for example, you can slide through a horizontal deck of vendor cards. Each card contains complete vendor information, pending invoices, and all year-to-date transactions with that vendor.

Softek Design's new a4 is the first accounting program to use the 4th Dimension database as its engine (you'll need either 4th Dimension or a run-time version in order to use a4). In addition to the basic accounting ledgers plus Inventory and Order Processing/Invoicing modules, a4's distinctive features include mail merge for form letters and a tracking program for sales prospects. A4 also allows a wide range of custom-built reports and can be customized even further by any 4th Dimension programmer, or by Softek.

These high-end multiuser programs pose more competition to the minicomputer market than do the general accounting programs. Because of its potent 4th Dimension engine, a4 in particular offers an attractive deal for minicomputer users who are looking for significant cost reductions with a moderate trade-off in performance. To use a4 to its fullest, however, you'll need a 68020 or 68030 server, plus 2MB of RAM in each user's machine.

Multiuser Program Recommendations

Which multiuser program you choose is largely a matter of your (and your accountant's) personal preference and the amount of support you'll need. If you lean toward solid, conventional programs, you should look at the MS-DOS adaptations such as Flexware and the sets from Great Plains and SBT. If you prefer more effective use of the Mac interface, you can choose among MDA, a4, and the Insight series.

My own preference is the Insight series, because of its sophisticated use of the Macintosh interface. But if I had just come to the Mac from a minicomputer or mainframe environment, I think I'd feel most comfortable with Great Plains, which has a wide range of solid, conventional programs; strong support; and screens that are not radically different from what I was already used to.

Choosing an Accounting Package

In terms of accounting procedures, all the programs I reviewed are on solid ground. But you had better involve your accountant in your selection, because he or she may have strong feelings about the features you should have. Also, find out what kind of support you can expect, both from the dealer and the publisher, and how much this support will cost.

Any of the general accounting programs should give you room enough to grow. Don't be hasty, however, in eliminating the higher-end modular programs. They cost more than the general accounting programs, but users with bookkeeping experience may feel more comfortable with the more traditional accounting procedures. The modular programs will also save you a lot of cost (and grief) in conversion and retraining should you eventually need a multiuser system.

Insight Expert

Accounting is a polished and thoughtfully designed program

No matter which type of accounting program you purchase—one-write, general, or multiuser—you'll be getting accurate and up-to-the-minute information that will help you do a better job of managing your business. And as a bonus, your checks, invoices, and statements will look as good as (or better than) the ones the big guys produce on their impersonal mainframes. ■

See *Where to Buy* for contact information.

***Alan L. Slay** is a free-lance writer based in Saint Louis; he specializes in financial and accounting software.*

Can Excel Be Beaten?

Analyzing Three Hot Spreadsheets

BY CHARLES SEITER

MARK ULRICH

EXCEL WAS THE FIRST *full-featured Macintosh spreadsheet, and it dominated the market so completely that Microsoft offered only minimal updates for several years. Then Ashton-Tate introduced Full Impact and Informix released Wingz, both high-end products that went beyond Excel. Now Microsoft has answered these challengers with Excel 2.2, a product which has finally had its 1MB spreadsheet-size limit increased to 8MB. Is Excel still king? I'll compare these three feature-heavy products in five key areas: number crunching, graphics, macros, connectivity, and auditing.*

Numerics

The whole point of spreadsheets, of course, is to automate calculations. Microsoft, Ashton-Tate, and Informix have done their arithmetic homework well: each program includes a good function set for its intended audience, and recalculation speeds are impressive. In each case, a half-megabyte budget spreadsheet loaded with typical text, data, and a mix of basic math operations (×, /, +, -) recalculates in less time on a IIx than a screen refresh on a IIx. Recalculation speeds for all three programs running on a stock SE are nearly equal. Recalculating a 100-by-100-cell block that contains floating-point multiplication shows the programs running close to the hardware speed limit for each type of Mac—that is, comparable to the rate you would find for 10,000 multiplications of numbers in an array programmed as an assembly-language loop.

Speed differences do show up when you use specific functions, such as EXP or PMT, and when you use a math coprocessor chip (see "Testing Spreadsheets"). Wingz, and to a lesser extent Full Impact, shows an advantage on Macs that have a 68030 CPU and a 68882 math coprocessor. For complex statistical calculations on an SE, Excel usually beats Wingz by a moderate amount, but for complex statistical tests on a 68030-based Mac, Wingz beats Excel by a good distance. Full Impact never disgraces itself, placing close to the top (or even first) on all machines and on most types of math functions. There are minute differences in numerical accuracy among the three programs in function calculation, although the accuracy of basic arithmetic is the same (see "Function Accuracy").

Excel 2.2 With a full set of business and science/engineering functions, including calculation of arrays and matrix arithmetic, Excel's wide range of numerical manipulations is a strong point. The implementation of some functions, however, seems unsophisticated these days: the RAND routine always gives you the same "random" number the first time you call it, and the entire function set is contained in one long scrolling list (functions are grouped as Business, Statistical, and so forth, in the other spreadsheets).

Full Impact 1.1 Full Impact is just a shade faster than its competitors on standard recalculation arithmetic in most tests. The function set is smaller, however; you will have to do some programming, for example, to solve linear equations. Business users are well served by a deliriously complete date function and all the expected financials. In short, Full Impact is optimized most effectively for users who produce budgets and quarterly reports.

Wingz 1.0 Wingz has all the standard functions and a good assortment of exotics, such as hyperbolic trigonometric functions. Many items that are functions in Excel are commands in Wingz—matrix facilities and linear equation solving facilities, for example. Commands are easier to use than functions, but they force you to program HyperScript macros for repetitive analysis of data sets. Recalc speed of basic arithmetic on the SE equals that of the other spreadsheets, except for a few calculations. Wingz's speed at math functions on 030/882 systems, however, gives it a serious advantage over Excel in engineering applications.

FUNCTION ACCURACY

	Full Impact 1.1	Wingz 1.0	Excel 2.2
LOG/EXP benchmark	15	14	15
SQRT benchmark	15	12	12

Numbers reflect accurate decimal places

All three programs displayed the same decimal place accuracy when performing basic arithmetic. When calculating functions, Full Impact consistently had 15 decimal places af accuracy. Wingz and Excel did comparably well an the lagarithm/exponent benchmark but drapped off three places in the square raat.

Graphics

How easy is it to create a basic chart in each program? In Full Impact, you select an area in your spreadsheet to graph, click on an icon bar to pick a chart type, and type the title directly on the resulting chart. You can't get much simpler than that. Second in simplicity, Excel includes a couple of extra steps—you must open a separate charting window to begin, and you must use menu choices to add a title. In last place, Wingz forces you to select a range, choose a graph tool, and open a view of the chart—no problem so far—but then it presents you with a nonintuitive five-step procedure for adding a title.

Redrawing on a IIx for all three is practically as fast as a mouse click, as tested on 50-element 2-D charts (3-D charts in Wingz take longer). On an SE, representative times for standard redraws give the speed edge to Wingz, followed by Full Impact, and then Excel.

Excel 2.2 The awkward charting interface of the original Excel is still present in version 2.2—charts are individual documents, created and managed separately from spreadsheets. If you want to print a single page containing charts, Excel tables, and text, you have to export the elements to Word 4.0 and adjust the layout. The exported table is still linked to its spreadsheet and can be automatically updated when you change the figures in the spreadsheet. For small documents, the integrated approach in Full Impact and Wingz is easier to use, but for a 40-page document with a dozen tables, Excel's links have the overwhelming advantage.

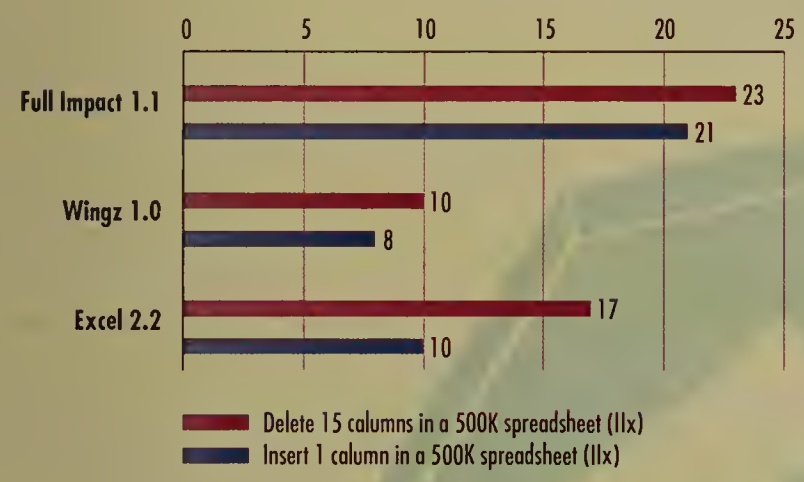
Excel offers columns, bars, lines, areas, pies, scatterplots, and a handful of combinations. Arrows and text overlays can be added. It also gives you detailed control of element line and fill styles, including mixed-color cross-hatching. You can automate chart production with macros.

Full Impact 1.1 Full Impact offers the same set of chart types as Excel, but has fewer subtypes. Nicely proportioned, properly scaled charts can be prepared quickly, with almost no practice, and arranged on the spreadsheet for an integrated business presentation. Full Impact includes some simple drawing tools and can import scanned graphics—but that's all you get for enhancing graphs. You'd better be sure you are happy with Full Impact's default graphs before you buy this program.

Wingz 1.0 Wingz offers a wide range of chart types that are comparable to those in a stand-alone graphing package and are far beyond anything offered by other

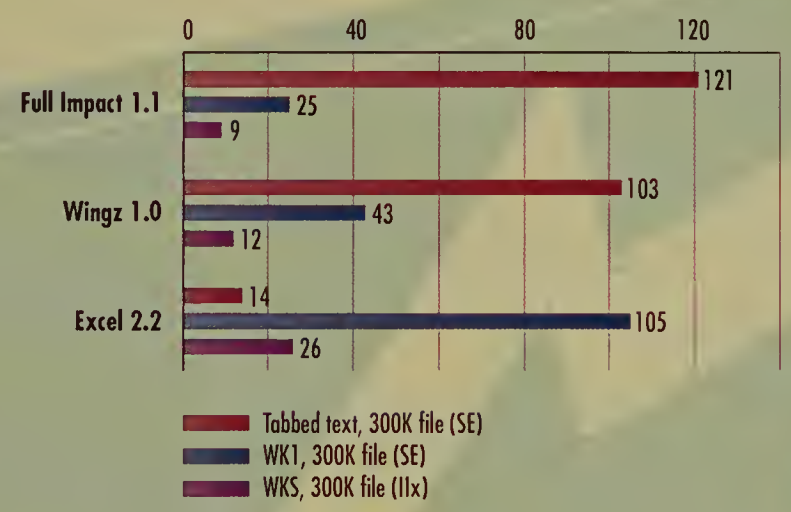
Testing Spreadsheets

Delete/Insert



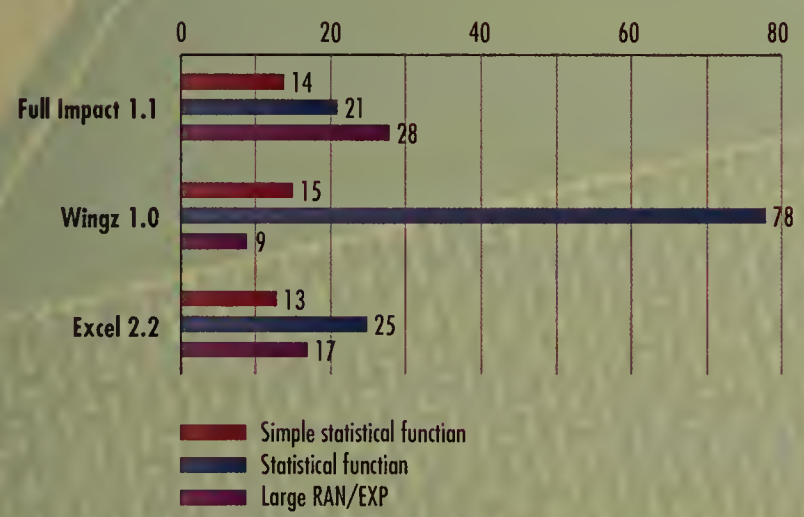
To test each program's interactivity I deleted and inserted columns of data—Wingz is the hands-down winner. Excel does a respectable job of inserting information, but bogs down on deletes. Full Impact is disgracefully slow.

Import



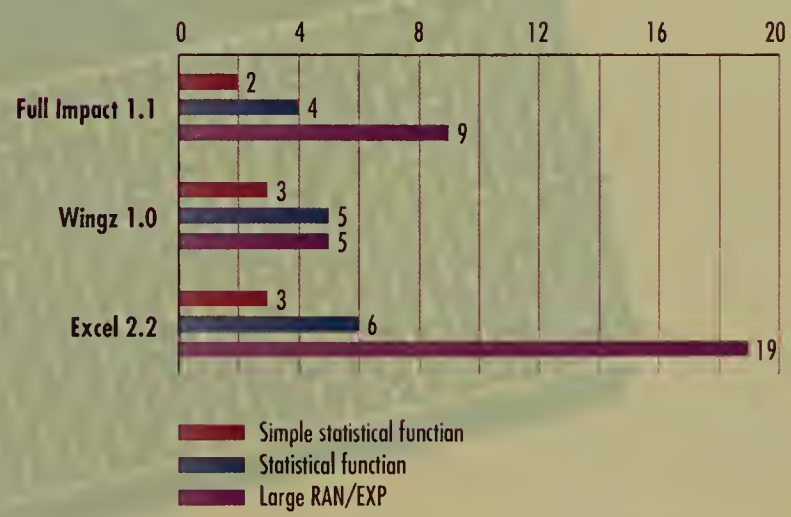
When importing tabbed text, Excel flies past its competitors. But when importing WK1 or WKS files, Excel becomes painfully slow; Full Impact definitely has the speed advantage.

Stats SE



The speed of recalculation for each spreadsheet depends on which functions are used and on which Mac the tests are run on. In my tests, simple statistical functions are recalculated at about the same rate for each program, no matter which Mac is used. When computing a statistical function such as the variance for large tables of numbers on an SE (left), Full Impact is the fastest,

Stats IIx



Excel is close behind, and Wingz trails by a long distance. The same computation on a Mac IIx (right) results in a nearly dead heat. In a repetitive computation with RAN and EXP on an SE (left), Wingz is almost twice as fast as Excel; Excel is almost twice as fast as Full Impact. On a Mac IIx (right), Wingz is still fastest, but Full Impact is more than twice as fast as Excel.

SPREADSHEET STATS

	Full Impact 1.1	Wingz 1.0	Excel 2.2
Company	Ashton-Tate	Informix Software	Microsoft Corporation
Price	$395	$399	$395
Requires	1MB	1MB	512K
SPREADSHEET DETAILS			
Maximum memory	16MB	limited by RAM	8MB
Maximum number of R x C	2048 x 256	32,000 x 32,000	16,000 x 256
Background recalc		•	•
Security/passwords	2 levels	2 levels	1 level
NUMERICS			
Number of functions	89	146	129
Matrix math		•	•
GRAPHICS			
Mixed graphics/text	•	•	
3-D charts		•	
Colors	8	16 million	8
Use PICT files	•	•	
Drawing tools	•	•	
Rotate graphs		•	
Scale graphs	•	•	•
Chart formats	7	20	7*
MACROS			
Custom menus		•	•
Custom dialog boxes		•	•
CONNECTIVITY			
File translation	WKS, SYLK, DIF, dBase II, III, IV	WKS, DIF, SYLK read-only	BIF†, WKS, SYLK, dBase II, III
Maximum number of linked sheets	8	limited by RAM	limited by RAM
Active links to other programs	none	none	Word, Mail
DATABASE FUNCTIONS			
Find		•	•
Extract	•	•	•
Delete		•	•
AUDITING			
Cell notes	•	•	•
Identify circular references	•	•	•
Select precedents/dependents		•	•

** Each type offers approximately 6 variant charts.* *† Excel format for IBM PC.*

spreadsheets. You choose from any of 20 chart styles, some of which are especially compelling 3-D variations on the usual diet of pies and bars. Unique styles include 3-D wire-frame and contour, and scientific charts (polar). You can fine-tune the color of each element—a great help in charts with more than a handful of elements. As in Full Impact, charts are part of the spreadsheet, printed with text and numbers in a unified layout. Drawing tools are available, but many of Wingz's charts are already flashy enough.

On a IIx, in particular, Wingz's computational speed combined with its 3-D chart variety makes it suitable for types of analysis that just can't be done with the other programs. Very often, plotting data in 3-D and rotating through various viewpoints can highlight interesting trends in data or a computation. Simple finite-element modeling of structural cross-sections and analysis of thermal or mass flows—these too are natural tasks for Wingz. For basic "Sales by Five Regions" charts, Full Impact's quick-and-easy style is compelling, but for turning complex sets of numbers into visual information, Wingz is the unchallenged leader.

MACROS

Macros enable ambitious users to customize their working environment and automate repetitive tasks. They also enable developers to produce stand-alone applications. All three programs let you automatically record keystrokes and mouse moves to create a macro. The programs differ greatly, however, in the ease with which you can edit these macros.

Excel 2.2 Unlike Excel 1.5, Excel 2.2's macros can include charting functions and call externally compiled code blocks. The macros when listed look more like assembly language than Pascal or C; they can be modified only with significant training and experience. Hundreds of macro examples and a small collection of books are available for newcomers.

Still, Excel's macro primitivism hasn't stopped developers from creating scores of applications. Because third-party applications usually demand modification of the spreadsheet interface, Excel offers a Dialog Editor for designing custom dialog boxes, as well as commands for modifying menus. The 225 macro commands, which include provision for direct manipulation of external files (besides use of external code), are also compatible with the IBM PC version of Excel, a great attraction for developers.

Full Impact 1.1 Full Impact macros produce neatly formatted and indented transcripts that look like Pascal programs. This makes Full Impact macros easier to read and modify than Excel macros. When you are editing a macro, you have available on a Commands menu all possible Full Impact actions collected by subgroups. This set of 164 commands constitutes an independent programming language called Full Talk. Several third-party applications that are fancier than any yet created with Excel or Wingz have already appeared.

You can define macros as global

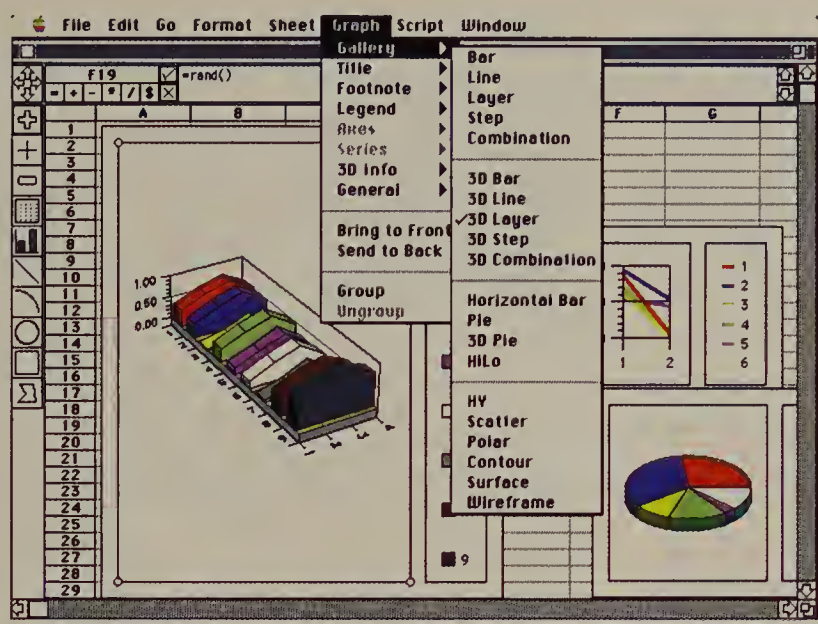
(applying to all spreadsheets) or as local (attached to a particular spreadsheet). You invoke macros with keystroke combinations, or as menu items, or by custom icons on the Full Impact icon bar. Because macros can be used to manipulate charts and text windows, Full Impact can automate the development of financial reports—the state of Maine, for example, relies on a set of macro programs designed by Third Wave Software to monitor academic performance versus expenditures in each of the state's school districts. Full Impact provides an extension called XMacros for invoking externally compiled code and includes an extensive example folder showing, explicitly, how to use code fragments written for popular Pascal and C compilers.

Wingz 1.0 It's really not appropriate to refer to Wingz's programming constructs as macros; Wingz's HyperScript is a perfectly respectable high-level language in its own right. Informix even used HyperScript to program Wingz's interface. Wingz's most impressive feature is translation of commands and actions into English-like HyperScript for easy editing and modification.

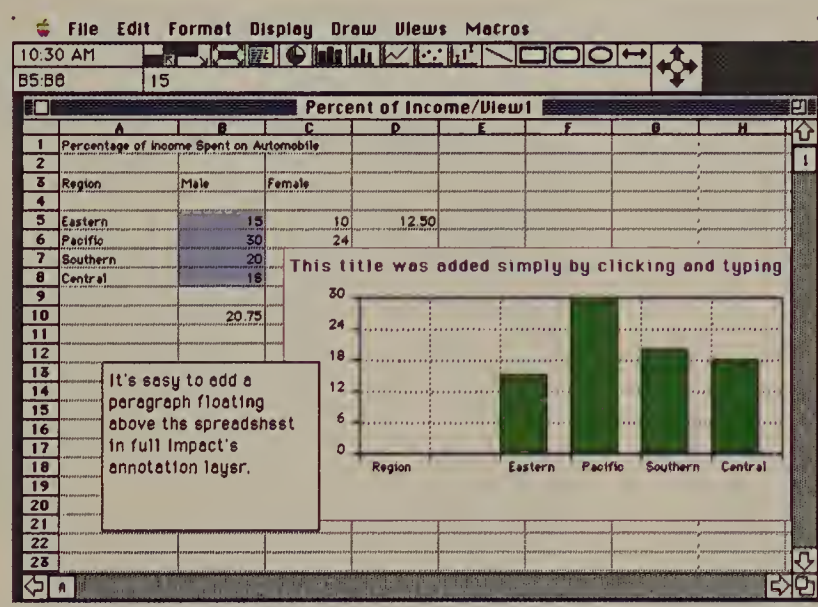
PUT 3.1416 INTO B5, for example, is the HyperScript equivalent of these three lines in an Excel macro:

```
=SELECT("R5C2")
=FORMULA("3.1416")
=RETURN
```

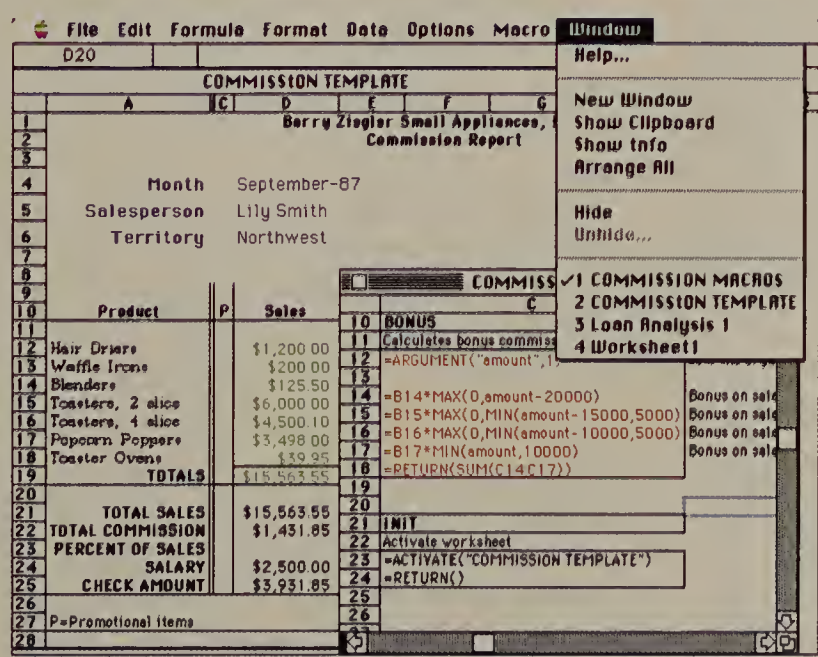
The HyperScript instruction set (more than 300 commands) gives you detailed control over custom dialog boxes and lets you invoke macro scripts from custom buttons placed anywhere in a spreadsheet. It includes a set of event handlers (commands like **ON MOUSEDOUBLECLICK**) comparable to those in HyperTalk. Use of code segments from other languages is handled just as it would be in C. Development of complex applications, involving prompts and custom help, is a far simpler task in Wingz than in its competitors.



Winging It
Besides calculational prowess, Wingz offers a dazzling array of charts, including 3-D types, with a reasonable set of format defaults. If you are willing to invest some time in mastering Wingz's large array of presentation tools, you can make pictures that are worth more than 10,000 cells.



Impact Is Easy
To create a chart in Full Impact, simply select a range and click on a chart icon. Adding a text note takes only a click on the text icon. For business users who want to create slick presentations at warp speed, Full Impact is the best choice.



Excel's New Look
Better late than never, Excel 2.2 offers most of the presentation enhancements of its rivals, such as variable row height and any mix of fonts, sizes, styles, and colors. One of Excel's real strengths, however, is MS-DOS compatibility: the macro shown here will run, unmodified, on an IBM PC. This gives Excel an important edge in business over Full Impact and Wingz.

Connectivity

Often it is necessary to send information between a spreadsheet and another program. For all but the simplest uses, therefore, spreadsheets should be able to read and write a variety of file formats, transmit information (charts, formulas, data, macros) across application boundaries, and link individual spreadsheets so that parts of a calculation can be consolidated.

Excel has superior connectivity to the MS-DOS world, but slow file translation (see "Testing Spreadsheets"). Full Impact has a fast, extensive set of translators, but limited spreadsheet linking. Wingz has convenient linking of unlimited scope, but the most limited set of format translators.

Excel 2.2 Excel has a big connectivity advantage, thanks to its twin in the MS-

DOS world. Special spreadsheet formats, charts, and even macros can be exchanged between the Mac and IBM PC versions of Excel with no modification. Thus Excel has an impressive edge in mixed PC-and-Mac environments. Excel 2.2 supports interspreadsheet links that are limited only by RAM, and lets you track and modify links in a special dialog box.

Full Impact 1.1 Ashton-Tate has connected Full Impact to the world of data stored in its own dBase formats, the de facto IBM PC database standard, as well as to other formats. A handy brochure on file translation (the only document of its kind offered by any of the three vendors) spells out exactly what will be saved and what will be lost when translating a document between formats. Interspreadsheet linking, however, is basic, underdocumented, and limited to 8 spreadsheets at a time, which can be a nuisance if you do monthly budget consolidations.

Wingz 1.0 Wingz has the smallest set of translators of the three products. It can, for example, read files in SYLK format, (Excel 1.5 and earlier), but it can't export files to SYLK. And, since Wingz offers more commands than other spreadsheets, it's difficult to translate a fully loaded Wingz spreadsheet into the format of a product that lacks Wingz's options. Linking facilities are limited only by RAM and are simple and flexible—you can enter a name such as **CostData:J23** in your budget spreadsheet and Wingz will copy cell J23 in the CostData spreadsheet into your budget spreadsheet.

Auditing

For spreadsheet applications that go beyond simple budgets, a program should provide facilities for documenting formulas and tracking down errors—a process called auditing. The usual documentation aid is the cell note, a box for text, attached to a given cell, which explains a formula or cell entry. Cell notes are most useful if a program contains convenient commands for finding, hiding, displaying, organizing, and printing the notes you have attached to a spreadsheet.

Error-tracking facilities, as shown in the Features table, differ greatly from product to product. At the most basic level, the spreadsheet makes an error flag such as EVAL or CIRC appear in a cell that can't be properly evaluated or contains a circular reference (that is, tries to use its own value in a formula). At the next level of assistance, the program points out the part of the formula or reference that causes the problem. The most sophisticated type of facility lets you trace all cells that depend on a selected cell or all other cells the selected cell references. For complicated formulas referencing dozens of cells across linked spreadsheets, this level of error tracking is essential.

Excel 2.2 Excel finally has a note facility, but the notes are managed almost as separate documents, with note references in a scrolling list. If you identify a note-containing cell with a color or a special border, however, you can find notes easily and double-click to open them, thus bypassing Excel's clunky interface.

For serious error-tracking Excel provides a Select Special command, which can be used for mundane chores, such as showing only cells with an error reference, or for highlighting all dependents and all precedents of a given cell. Select Special can also highlight row differences and column differences, a fast way to check if blocks of formulas have been properly copied and positioned. Excel has six error-evaluation functions and a complete set of usually understandable error messages. Finally, a status bar at the bottom of the screen reports circular references and names the offending cell.

Full Impact 1.1 Full Impact has a superior note facility but offers almost no auditing help. The spreadsheet uses a layer called the annotation surface, superimposed on the spreadsheet, to store notes, graphs, or even pictures that might help explain a spreadsheet's design. Paragraphs created in graphic annotation blocks can be sized, moved, and printed separately, and the paragraphs themselves can employ function references for self-labeling with document name, date, and time. In contrast to this advanced annotation scheme, auditing is primitive. Twenty-four simple error flags and three error-evaluation functions constitute the active error-tracking facility—there's simply no equivalent of the modern dependents/precedents tracing offered in other programs. It's one of the few core spreadsheet areas in which Full Impact seems lacking.

Wingz 1.0 This program has a note facility as good as Full Impact's and auditing aids as good as Excel's—it's certainly helpful to have both in a single package. Notes can be created, sized, and arranged as floating elements on the spreadsheet, or they can be created specifically as cell notes, to be displayed or hidden with menu commands. Auditing help includes display of cell dependents/precedents; selection of unreferenced cells; formatted blank cells; and error cells by type (Wingz includes nine types of error function). The set of 66 error messages is unusually complete, and Wingz's manual has an exemplary discussion of auditing. The HyperScript language provides access to all the standard types of error function (**ISERR**, for example) and some of its own (**ISCIRCULAR**). Like graphics, auditing is a Wingz strong point.

What's Best

Wingz is the clear leader for graphics features, programmability, and high-end computational performance. Full Impact, in contrast, is the clear leader for ease of use—a complete beginner can learn to make an attractive tables-and-graphs report within minutes. Unfortunately, Full Impact is feature-poor compared to the other programs.

In release 2.2, Excel has brought its features list and capacity up to current standards; it has done this so thoroughly that it would be hard for many longtime Excel users to justify a switch. Excel occupies, still, a broad middle region of the market, despite the undeniable appeal of Wingz for advanced graphics applications and the lure of Full Impact's convenient just-click-the-icons interface. ■

See *Where to Buy* for contact information.

Charles Seiter *has been a long-term beta tester for most Mac spreadsheets, with a primary interest in macro programming for scientific applications.*

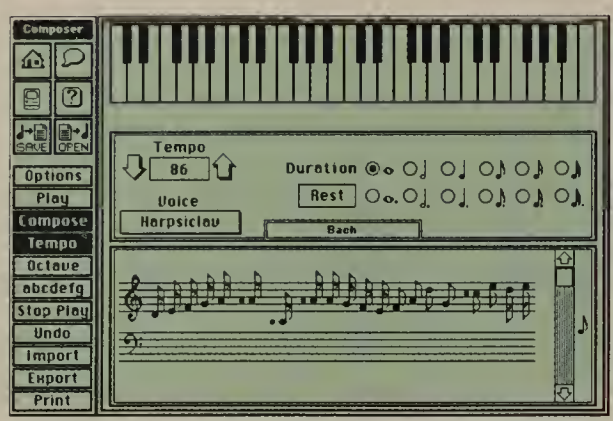
SuperStacks

The 1989 Winners

The best HyperCard stacks in ten categories

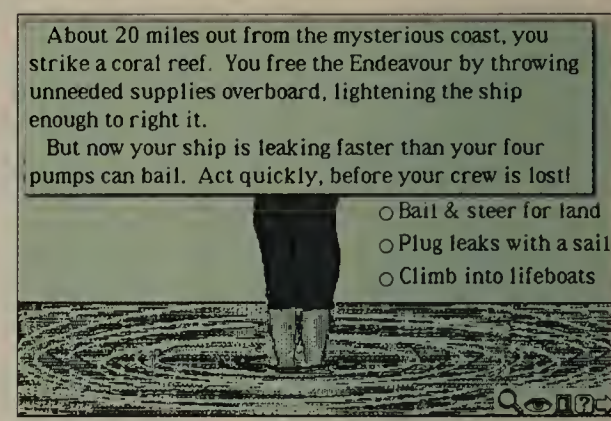
by Liza Weiman

Mail call during a *Macworld* contest is always amazing. Bearing postmarks from around the world, entries begin to arrive in ones and twos. Soon they are delivered in boxes. Near the contest deadline, we watch them stack up (no pun intended) with a dazed expression on our faces. Judging over 400 excellent entries may not measure up to such Herculean tasks as stealing the golden apples of the Hesperides or killing the Hydra, but we thought it was a lot to ask of a group of mere mortals. Luckily, our judges performed like epic heroes.



Mac Bach
HyperComposer makes it easy to write music for stacks. Selecting the note on the lower right, for instance, transforms the musical notes on the staff to HyperTalk text. Changing the voice, tempo, or duration of the notes is as simple as selecting from pop-up menus. You can export your song to another stack using the Export tool on the palette at left.

Unattended Flight
In this animation example, the cursor has been replaced by a helicopter. Clicking on the Show icon begins a demonstration of pilotless flight around the screen; clicking on the helicopter lets you fly it with the mouse. The cut-away tabs along the bottom of the screen take you to cards that demonstrate other animation techniques.



That Sinking Feeling
Simulations created with winning stack Alias demand quick thinking, creative problem solving, and accurate historical knowledge. Here Captain Cook's ship has foundered on a coral reef and the entire crew will be lost unless the student knows that plugging the leaks with a sail was a commonplace practice in eighteenth-century seacraft.

The overall quality of this year's stacks testifies to the growing maturity of the HyperCard community; more stacks did more things very well. Most interestingly, many of the winning stacks are actually tool kits that make it easier for nonprogrammers to take full advantage of the powers of HyperTalk. In the words of one of our winners, "The really great thing about HyperCard is that it makes room for generalists to succeed in a society that usually rewards single-minded people."

The judges from Apple Computer's engineering, product development, marketing, and multimedia teams were Doug Doyle, Mike Holm, Carol Kaehler, Kristee Kreitman, Leslie Liedtka, Steve Maller, and Linda Stone. Our other judges were Amanda Goodenough, author of Amanda-Stories I & II; Bob Goodenough, member of the original HyperCard Team; Nancy Dunn, *Macworld* contributing editor; and Raines Cohen, chairman of BMUG's board of directors.

The judging criteria included creativity, appropriate use of HyperCard's features, interface design, success in meeting the stack's stated goals, and scripting elegance. All of the winning stacks presented a clear navigational structure; a pleasing graphic design; and each one instructed, entertained, or challenged us to think about old problems in new ways.

Here is a brief overview of each of the first place stacks.

HyperComposer—Commercial

With HyperComposer, our winner in the Best Commercial Stack category, you can compose, edit, view, play, and print music without being a HyperTalk programmer. Developers Randy McCallum and Lloyd Bernhardt initially developed HyperComposer as an in-house tool for adding music to corporate presentations. Once it was in beta form, however, they realized that it had larger commercial potential. The publishing house of Addison-Wesley agreed and together they now have a hit on their hands.

To write music into a HyperCard stack, users must ordinarily type in a **play** command, complete with a specified voice, tempo, pitch, and duration for each note. HyperComposer lets you compose music by placing notes on a staff, clicking on a piano keyboard graphic with the mouse, or (if you insist) typing in the notes as text (see "Mac Bach"). Better yet, HyperComposer can automatically convert a HyperTalk score (text) into a printable musical score (notes on a staff).

"Our goal," said McCallum, "was to make the power of HyperTalk available to people who aren't programmers. Everything HyperComposer can do has always been available in HyperCard, but there was just no interface for it."

MATTHEW MCVAY

HyperComposer
The developers of HyperComposer, Lloyd Bernhardt (left) and Randy McCallum (right), demonstrate yet another way to compose music for HyperCard stacks, the old-fashioned way. Lloyd and Randy used to develop multimedia presentations for the IBM PC.

Animation Help—Noncommercial

Using Animation Help, Jeremy Ahouse's winning noncommercial stack, even a novice HyperCard author can make snakes slither, balls bounce, helicopters fly, Macs rotate in space, and the starship *Enterprise* come in for a landing. Best of all you can examine the scripts behind these examples and learn how to animate your own work.

Each screen of Animation Help illustrates a specific animation technique—card-to-card, icon, font, cursor, and so forth. You simply click on the Show icon for a demonstration of it (see "Unattended Flight"). "I was teaching classes on animation techniques," said Ahouse, "and I wanted to create something that was fun

1989 WINNER'S CIRCLE

Listed here ore the 10 cotegories ond 34 winners for the 1989 SuperStacks HyperCard opplication contest—cosponsored with Apple Computer.

BEST COMMERCIAL STACK

First Place

- HyperComposer—Motion Works, published by Addison-Wesley Publishing Company

Second Place

- The Electronic Whole Earth Cotalog—The Point Foundotion, published by Brøderbund Softwore

Honorable Mention

- Golf Doctor—Nathan L. Tennies, Bootstrap Enterprises, 1 Step Software

BEST NONCOMMERCIAL STACK

First Place

- Animotion Help—Jeremy Ahouse

Second Place

- Letter Learner—Robert Orenstein

Honorable Mention

- If Monks Hod Mocs—Brian Thomos ond Philip A. Moore Jr.

BEST EDUCATIONAL STACK

First Place

- Alios—Brodie Lockord, CAT Project, Stonford University

Second Place

- Vivo II—Bernord Lavie, Educotionol Computing Consortium B.V.

Honorable Mention

- The Fomily Life Educotion Stack—Steve Hombletan, Morigold Elementary School

Honorable Mention

- KanjiCards—Clote Sonders, Dezso Benedek, ond Junko Mojimo, University of Georgia

BEST CUSTOM STACK

First Place

- Basics of Digitol Voice Technology—Codex Educotional Services and Butler, Roila and Company

Second Place

- Movies on Video—Bruce Choronnot, Clement Mok Designs

Honorable Mention

- MocLife—Eric Azorcon, HeortBeot Software Solutions

Honorable Mention

- CallBack 3.0—Motthew Coates, The Broodcost Group

BEST DEVELOPMENT TOOL

First Place

- HyperSound 2.0—Dan Callowoy ond Joe Sensendorf, Forollon Computing

Second Place

- HyperComposer—Motion Works, published by Addison-Wesley Publishing Company

Honorable Mention

- Dortmouth XCMD's, Volumes I–III—Roger Brown and Kevin Colhoun, Dortmouth College

Honorable Mention

- The Voyoger Videostack—The Voyager Company

BEST MULTIMEDIA APPLICATION

First Place

- The '88 Vote: Compaign for the White House—David Bohrmon, Lorry Wood, ond Williom E. Lord, ABC News Interactive

Second Place

- Cordioc Imoging—Potrick Lynch ond Carl Joffe, Yole University

Honorable Mention

- Vincent von Gogh Loserguide—The Voyoger Company

BEST INTERFACE DESIGN

First Place

- Movies on Video—Bruce Choronnot, Clement Mok Designs

Second Place

- Basics of Digital Voice Technology—Codex Educotionol Services ond Butler, Raila ond Company

Honorable Mention

- Cordioc Imoging—Potrick Lynch ond Corl Joffe, Yale University

Honorable Mention

- Vincent van Gogh Laserguide—The Voyoger Company

MOST ARTISTIC STACK

First Place

- Signs of Type—Zuzano Licko

Second Place

- Possing Notes—Brion Thomas ond Philip A. Moore Jr.

Honorable Mention

- The Fomily Life Educotion Stack—Steve Hambleton, Marigold Elementary School

Honorable Mention

- 3Com—Dovid Donaldson, HyperPro

SPECIAL RECOGNITION: BEST STACK FOR UNDER $20

Honorable Mention

- Conservotion Biology Questions—Jeremy Ahouse

Honorable Mention

- Freedom Trail—BCS Moc, MacStackGroup, Boston Computer Society

Honorable Mention

- HyperCord ond History—Steve Gross

SPECIAL RECOGNITION: INTERNATIONAL ENTRIES

Honorable Mention

- *Doko Kara Kitano?* (Where Is the Cot From?)—Mosayo Ohoshi, Japan

Honorable Mention

- MonogerSpot—Andreas W. Vichr, West Germony

For o close-up look at the winners, *Macworld* and Apple Computer ore pleased to onnounce that the winning stacks will be ovailable on CD ROM. Return this coupon for more information.

Yes! Count me in! I would like to know more obout the *Macworld* Apple Computer CD ROM of the SuperStocks winners. Send informotion to me at:

Name _____

Address _____

City _____

State _____ Zip _____

Return, with SASE, to: Mocworld Mogozine - CD ROM Project, 501 Second St., Son Francisco, CA 94107

SEARCHING FOR STACKS

For those of you who hunger for more stacks, here's a brief listing of resources for your hunt.

Budgetbytes offers over 500 public domain and shareware stacks for $3.19 per single-sided disk, $5.99 per double-sided disk. Budgetbytes, 1647 S.W. 41st St., Topeka, KS 66609; 800/356-3551.

EduCorp provides public domain and shareware software for $6.99 per disk. EduCorp, 531 Stevens Ave., Ste. B, Solana Beach, CA 92705; 800/843-9497.

Heizer Software offers over 300 stackware titles ranging from $6 to $99. Heizer Software, P.O. Box 232019, Pleasant Hill, CA 94523; 415/943-7667.

HyperMedia and Instructional StackWare Clearinghouse (HISC) is a clearinghouse of high-quality instructional, administrative, and utility stackware for educators and trainers. Contact Scott Brabinger, University of Colorado at Denver, Campus Box 106, 1200 Lorimer St., Denver, CO 80204-5300; CompuServe 76136,2073.

Maxstax+ is a nationwide, mail-order publisher and developer of HyperCard software. Maxstax+, P.O. Box 2719, Oakland, CA 94602; 415/530-1971, 800/544-0577.

Online Services such as CompuServe (614/457-0802, 800/848-8199), GEnie (301/340-4000, 800/638-9636), and Connect (MacNet) (408/973-0110) are always a good source for stackware, gossip, and vital Macintosh news.

Samak Software has over 300 stacks of public domain and shareware programs for $8.99 per disk. For a free catalog, write Samak Software, Inc., 535 Encinitas Blvd., #113, Encinitas, CA 92024; 619/942-2556, orders 800/842-5020.

The Complete HyperCard Buyer's Guide is a 700K stack listing all major commercial stackware available. $10 from Digital Media Publications, Inc., MIT Branch, P.O. Box 315, Cambridge, MA 02139; 617/494-8196. Free from CompuServe, GEnie, and many user groups.

The Public Domain Exchange publishes *The Best Mac Deal*, a directory of public domain and shareware stacks, and a quarterly *PDE Magazine*. $20 membership fee includes a free directory, the magazine, and quarterly membership specials. The Public Domain Exchange, 2074C Walsh Ave., Santa Clara, CA 95050; 408/496-0624, 800/331-8125.

User groups are a great stack resource; here are two that come to the national shows, but check your local one too. See *Macworld's* User Group Directory, September 1989, or call Apple's User Group hotline 800/538-9696.

Apple Corps of Dallas & Mac Pack offer over 500MB of stacks for $7 per disk. Each disk comes with an index and explanatory read-me file. Write Doug Redman, Sunrise Electronics Inc., 1715 N. Broadway, Carrollton, TX 75006; 214/242-3366, fax 214/242-8840.

BMUG PD Library offers more than 2000 HyperCard stacks on floppy disks, organized by topic, for $4 each. Their PD ROM, available for $100, is also chock-full of HyperCard treasures. To order stacks, write or call BMUG HyperCard Library, 1442A Walnut St., #62, Berkeley, CA 94709; 415/549-2684.

BCS offers a monthly series of the best available stackware from all the major electronic BBSs and its own sources. Twice yearly BCS also offers compilations of the best of the monthly finds, the StackSet. Best of BCS Development Tools and Best of BCS Stackware (five-disk subsets) are also available twice yearly. All disks are $4 per disk for members, $10 per disk for nonmembers. A catalog is available for $15. BCS Mac Office, 48 Grove St., Somerville, MA 02140; 617/625-7080.

and accessible enough to draw people into doing simple programming."

With this stack, he clearly achieved his goal. Besides cataloging HyperCard's animation options in a clear and stimulating manner, the stack is a wonderful tool kit that can be torn apart and studied.

Alias—Educational

Imagine yourself as the noted eighteenth-century explorer, Captain James Cook, recently appointed to the command of the *Endeavour Bark* by the Lord High Admiral of Great Britain. To accomplish your task, you must hire a crew, plan your itinerary, captain your vessel, juggle several hidden agendas, and deal with various disasters (see "That Sinking Feeling").

This scenario describes a simulation stack that allows students to make decisions and take actions based on their knowledge of history. The stack was created using Alias, this year's Best Educational Stack winner.

Brodie Lockard created Alias at Stanford's CAT (Course Authoring Tools) Project, to make historical, cultural, and social simulations easy for instructors who have no formal knowledge of computer programming. To use Alias, instructors enter information—including text, graphics, sounds, and even video—about the world they are simulating.

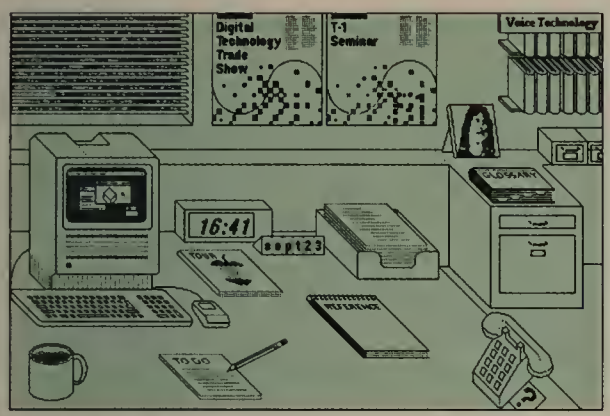
Then, as students move through the simulation, they must make decisions about each event; each choice creates a unique path through the material. Instructors can also create commodity exchange rates and social relationships with ranked status levels, adding complexity to the social and political worlds being re-created.

"The point," says Lockard, "is to let students experiment with situations that are otherwise too expensive, too dangerous, too inconvenient, too time-consuming, or altogether impossible."

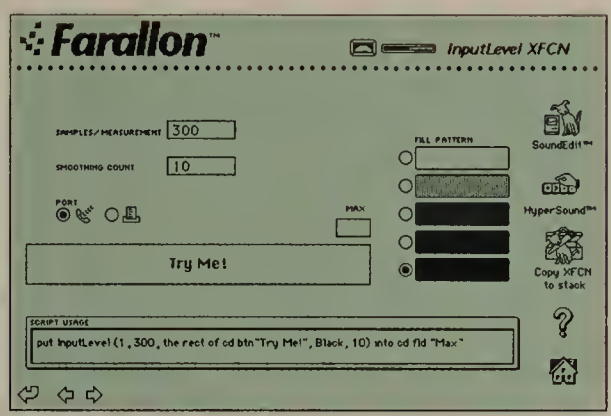
Basics of Digital Voice Technology—Custom

Placing first in the Best Custom Stack category and second in Best Interface Design, Basics of Digital Voice Technology solves a common, and critical, problem. It teaches advanced technology in an entertaining and challenging manner. The stack allows the user to learn through solving problems, presented as increasingly difficult demands from a distant boss, in a simulated environment that encourages self-paced learning.

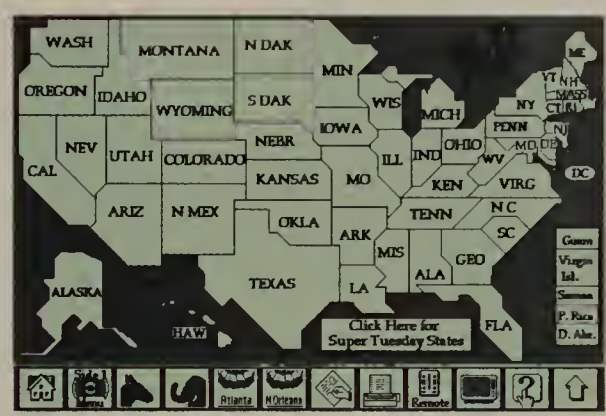
All the information necessary to complete the course is available in the stack (see "At the Office"), and there are clearly identified objectives associated with each of the four challenges you must meet. Self-tests are available to gauge your progress and a certification test at the end rewards the diligent student. The interactive de-



At the Office
This desk is your home base as you try to solve the problems that the boss throws at you. The company library, the T-1 Seminar, the Digital Technology Trade Show, the file cabinet, and the glossary of terms all contain the information you'll need. There is (of course) a Mac for sending the boss your results.



Try Me
To expand your HyperCard sound engineering capabilities, HyperSound offers 11 XCMDs and XFCNs that you can easily place in your own stacks. The Sound Toolkit explains and demonstrates each of them. Here, the InputLevel XFCN allows you to create custom input sliders for your stacks.



20/20 Hindsight
The icons along the bottom of each screen in The '88 Vote make it easy to travel through complex information. The party symbols, for instance, link you to the biography of that party's candidate for president. The Atlanta and New Orleans banners take you to detailed content menus for each convention.

sign of this course makes difficult information easier to learn than it would be by reading a tutorial or attending a lecture.

The stack is the result of a collaboration between Codex Corporation (a division of Motorola) and Butler, Raila and Company, communication consultants. Dennis Hawley, director of educational services at Codex, couldn't be happier with the result. "People love the interactivity, learner control, and the variety of ways to get information from the stack. Also, because it is a self-study program, it helps to keep our training costs down."

HyperSound—Development Tool

HyperSound 2.0, the winner for Best Development Tool, is an update to the software that ships with Farallon Computing's MacRecorder Sound System. Designed by Dan Callaway and Joe Sensendorf, version 2.0 adds the ability to play and record sounds in 3:1, 4:1, 6:1, and 8:1 compressions and offers 11 external commands and functions (XCMDs and XFCNs) that simplify sound editing and recording in HyperCard. HyperSound displays the type, size, and length of a sound resource, and supports the Clipboard, making it easy to cut and paste sounds into your own stacks.

HyperSound also comes with the Sound Toolkit, which explains and demonstrates the external commands and functions that come with HyperSound 2.0 (see "Try Me"). Our judges picked it as this year's best development tool because they felt it lets HyperCard do something that it simply can't do otherwise.

The '88 Vote: Campaign for the White House—Multimedia

The '88 Vote: Campaign for the White House, winner for Best Multimedia Application, lets you explore the presidential campaign by navigating through a stack that contains detailed information about the election and controls a videodisk full of clips from the ABC archives.

You could begin using The '88 Vote by looking up the biographies and background information on each party's candidates. Or you could watch excerpts from each party's national convention. For further research, you could read the transcripts or watch highlights of the key speeches. You can even hear expert political commentaries on voice-overs if you want to get the inside scoop on the action.

Critical campaign issues are presented in a point-counterpoint fashion and some of the more infamous political commercials of 1988 are available, as well. For a wrap-up of the whole affair, you can take a detailed look at the results on a state-by-state basis (see "20/20 Hindsight").

Besides providing everything a student of the political process might need, The '88 Vote lets you play network producer. With the Documentary Maker you can select up to 15 video clips at a time and cue them up for your own portrait of the race for the White House.

Developed by ABC's David Bohrman, Larry Wood, William E. Lord, and Robert Jordan, The '88 Vote is the first of a planned series of interactive videodisks produced by ABC News Interactive.

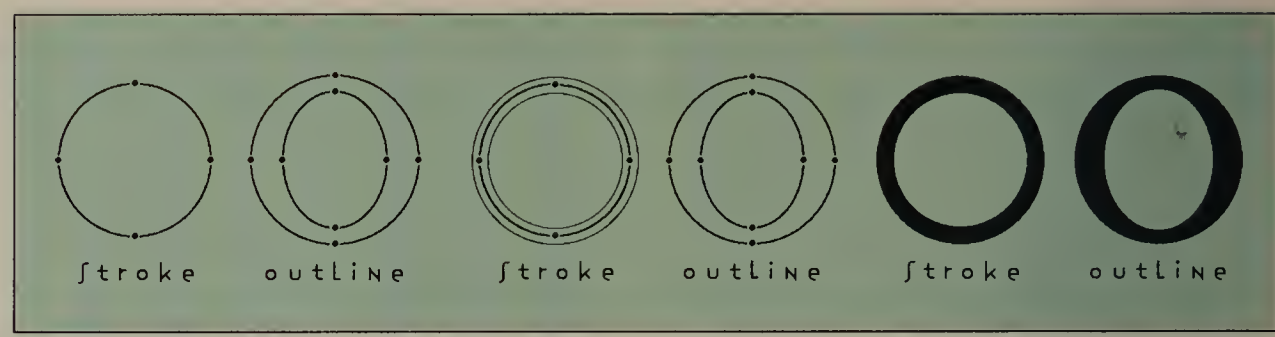
EMMETT MARTIN

Cardiac Imaging
Patrick Lynch (right) and Carl Jaffe (left) worked together to create Cardiac Imaging, a multimedia application designed to teach medical interns echocardiography, which is ultrasound of the heart. Patrick did the HyperCard scripting and technical illustrations, while Carl put together the videodisk using his years of expertise as a radiologist.

Movies on Video—Interface Design

When The Good Guides asked graphic artist Bruce Charonnat to design a stack based on their guide to movies available on videocassette, Charronat designed the buttons and indexes that allow you to search for movies in ways that a book

Annie Hall
In Movies on Video, nearly everything is linked to another part of the stack. Clicking on the film reel icon, for instance, takes you to other movies that won the Academy Awards for best film selecting Woody Allen's name takes you to more of his work.



O Is for Outline
Signs of Type combines a strikingly clean graphic design with custom PostScript fonts and animation designed to showcase the fonts and teach the techniques used to create them. This animation sequence demonstrates that outline characters require more data points to describe their tapering shapes, taking up more memory than stroke characters do.

simply can't—by title, director, actors, year, length, topic, Academy Award nominations, ratings, and more.

Charonnat's work placed first in the Best Interface Design category and second in the Best Custom Stack. The stack stood out because it is visually appealing, clever (a director's chair icon represents an Academy Award for best director), and always crystal clear. Although Movies on Video maintains an uncluttered look, virtually everything on the screen is a button linked to other related movies or to a navigational icon (see "Annie Hall"). We never got lost while browsing, although we often wished that we could.

Signs of Type—Artistic

Zuzana Licko developed Signs of Type, this year's winner for Most Artistic Stack, as an educational and promotional tool for her design business. (Her stack also took top honors in the Business and Informational Graphics category in this year's Macintosh Masters art contest.) Licko creates custom Macintosh PostScript typefaces, and her stack complements a booklet of the same name that displays her fonts. She decided to convert the booklet to stack form because she can update it easily and add animation to her work.

It took her three weeks to design and develop Signs of Type. The electronic catalog showcases her fonts while teaching the principles of PostScript font design through elegant animation and succinct description (see "O Is for Outline"). Signs of Type includes samples of each of Licko's custom fonts and an order form that makes it easy to order your favorites.

Special Recognition: Under $20

The good news is that many of the best SuperStacks entries are available for under $20. The bad news is that the judges were simply unable to identify a clear winner for this category—the competition was just too close. Three of the best, however, were singled out as outstanding stacks for an outstanding price and all received an Honorable Mention.

- Jeremy Ahouse, author of Conservation Biology Questions, says that this stack was compiled "with the conviction that it is questions that focus our pursuits and that the clearer our questions are, the better our solutions will be."
- The Freedom Trail was created by members and friends of the BCS Mac MacStackGroup to show off both the potential of HyperCard and the historic richness of Boston.
- Steve Grass wrote HyperCard and History as an aid to teaching social studies. It explores the facts, myths, theories, and legends that surround the assassination of John F. Kennedy.

DRAKE SOREY

Alias
Bradie Lackard, a member of the Course Authoring Tools Project at Stanford University, used HyperCard to create Alias, a general-purpose toolkit that any faculty member can use to create historical, cultural, and social simulations. In the works are a simulation of the life of an early nineteenth-century film magul, the life of a person born in Japan in 1930, and a recovering cardiac patient.

Special Recognition: International

This year we received SuperStacks entries from Canada, West Germany, England, Japan, and the Netherlands. Two international stacks stood out.

- ManagerSpot, by Andreas W. Vichr of West Germany, was designed as a HyperAd to promote a customized 4th Dimension application.
- *Doko Kara Kitano?* (Where Is the Cat From?), by Masayo Ohashi of Japan, is an adventure tale of a girl and a cat journeying through time and space.

We hope you've enjoyed this glimpse at the winning stacks of the 1989 SuperStacks competition. Watch these pages for next year's deadline. ■

See *Where to Buy* for contact information.

SuperStacks 1989 was made possible by support from the following companies: Apple Computer, Jasmine Technologies, National Semiconductor, and Sony Corporation.

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REVIEWS

COLORBOARD 264

24-bit Color Board

Pros: *Inexpensive; provides 24-bit color; easy to install; fully compatible with 32-bit QuickDraw; can run two monitors; can output 8-bit gray-scale video to VCRs; can output NTSC video.* ***Cons:*** *Drives only 640 by 480 monitors.* ***Company:*** *RasterOps.* ***Requires:*** *Mac II. System 6.03.* ***List price:*** *$995.*

Every so often I receive a product that is so well-conceived and well-executed that it makes me smile. RasterOps's ColorBoard 264 made me do more than smile—it made me grin.

The ColorBoard 264 drives any 640 by 480 resolution monitor (read, Apple's 13-inch color monitor). For about $300 more (list price) than Apple's 8-bit video board, the ColorBoard 264 lets you display 24 bits of color as well as the 2, 4, and 8 bits of color that the Apple board supports. Thus, with the ColorBoard 264 you can opt for 2, 4, 16, 256, or over 16 million colors on screen simultaneously.

You'll want to run the ColorBoard 264 in 2-, 4-, or 8-bit mode when working with spreadsheets, word processors, or databases, since 24-bit mode quite noticeably slows down screen refresh and scrolling. For instance, if you type text in 24-bit mode, letters appear to jump as they are entered. But when viewing photographic images, such as 24-bit scanned graphics, you'll really appreciate being able to view up to 16 million colors at once.

When you work in, say, 16-bit mode, if you need any colors not available on the 256-color palette, the software produces them by dithering—that is, it arranges several colored dots so that the eye sees them as one new color. However, dithered images look grainy, like a bad photograph. With the 24-bit mode, each dot in the 16-million-color display can be the exact color, thus images appear to be at a higher resolution.

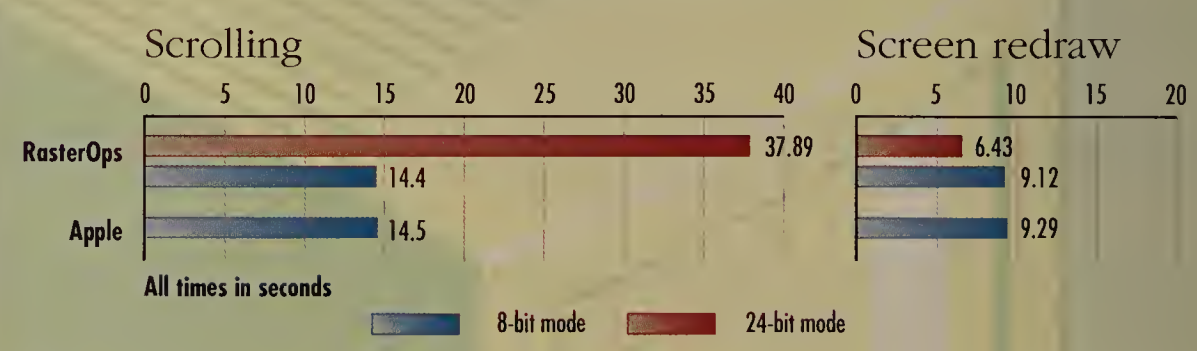
Design Award

Installing the ColorBoard 264 is straightforward. First, you install System 6.0.3 and Apple's 32-bit QuickDraw INIT (if they're not already present). Then you pop the ColorBoard 264 into any empty NuBus slot. That's it—but remember, if you are currently using an Apple color board you'll need to remove it first. Otherwise you run the risk of making the Mac think you have two monitors attached. In this situation your cursor will often disappear from the screen and move onto the other "monitor," forcing you to move the mouse around trying to get the cursor back on screen.

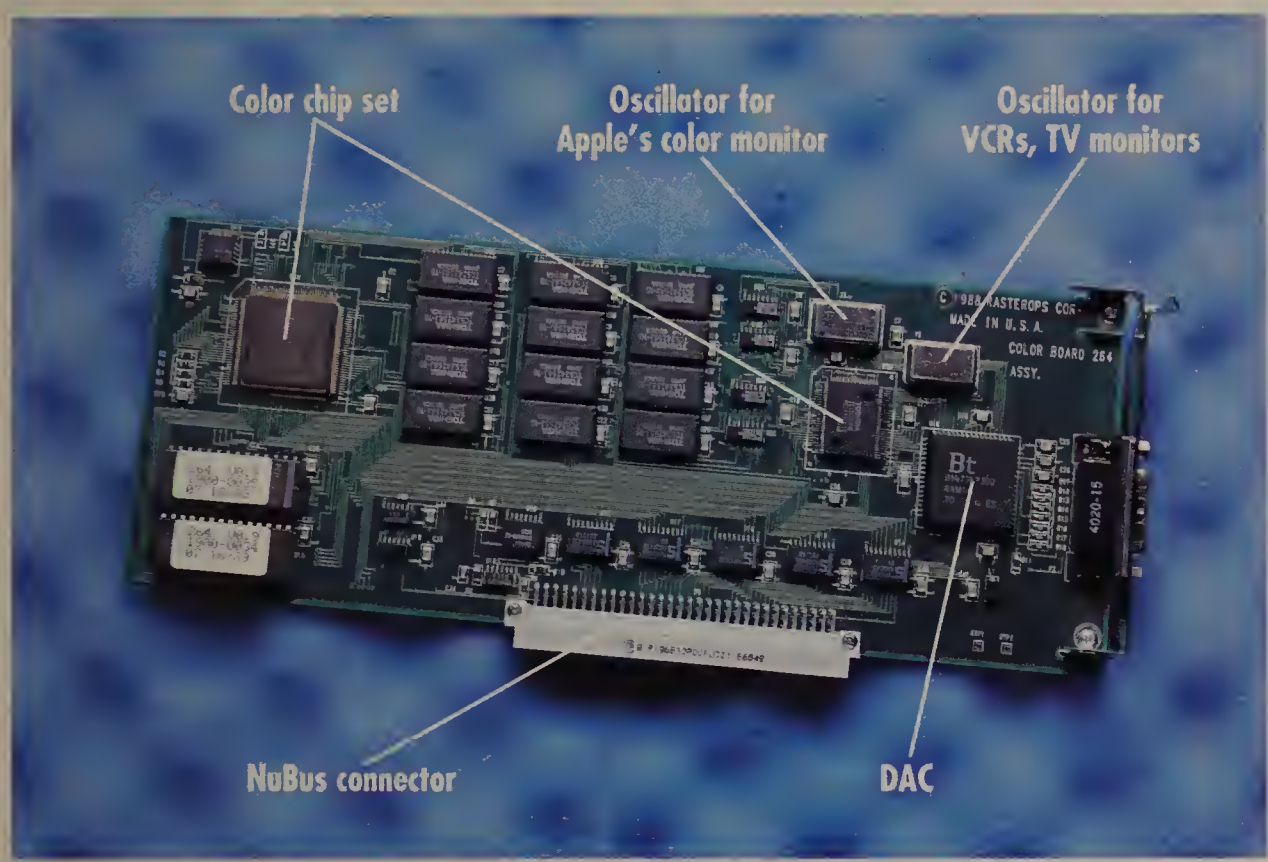
The ColorBoard 264 is also nicely designed. Because the chips are surface mounted instead of socketed, the leads will not become bent or the contacts dirty, which can cause the board to malfunction. The board has many fewer chips than the Apple color board, making it not only cheaper to manufacture but also more reliable because it produces less heat. In addition, the board draws only 1 amp at 5 volts of power through the NuBus slot (much less than the Apple board's recommended 2.1-amp maximum), so you won't have to give up one of the Mac II's NuBus slots.

The Mac SE/30 version of the ColorBoard 264 is more expensive ($1295) than the Mac II version, mainly because the SE/30 uses a direct slot instead of a NuBus slot. The board must be hooked to the back of the Mac SE/30 via a special bracket assembly and cable. Also, one of the custom chips the Mac II version uses to

BENCHMARKS



Scrolling When scrolling through a 100-row spreadsheet in 24-bit mode, the ColorBoard 264 is painfully slow, taking more than twice as long as it does in 8-bit mode. Compared to the Apple board in 8-bit mode, however, the ColorBoard 264 is actually a hair faster. **Screen redraw** The Apple board doesn't support 16 million colors and it doesn't have a 24-bit mode, but both the Apple and RasterOps color boards can display a 24-bit image in 8-bit mode. Although the RasterOps board draws the image faster than the Apple board in 24-bit mode, the ColorBoard 264 draws the image even faster.



MARK JOHANN

RasterOps's ColorBoard 264 sports a clean, simple design. A mere two chips control all NuBus and color logic. The DAC (Digital to Analog Converter) uses a new design that replaces three chips on other 24-bit boards. The board also uses four 1MB memory chips as opposed to the sixteen 256MB chips the Apple color board uses.

control NuBus logic had to be replaced on the SE/30 version with several separate chips, increasing the cost for parts and manufacturing.

Complete Compatibility

I used the ColorBoard 264 with a wide variety of applications, including some not-so-common utilities such as the Color Cursor INIT, which paints the cursor in the Apple logo colors, and Big Pat, which gives you a large grid for creating detailed background patterns. Only Adobe Illustrator and an old copy of LaserPaint Color II (version 1.9.2) refused to run in 24-bit mode (although they work fine in 8-bit mode), and there the compatibility problem lay with the software, not the ColorBoard 264. Adobe is updating Illustrator, and the latest version of LaserPaint Color II (2.0) works fine in 24-bit mode.

Since Apple has made 32-bit QuickDraw its color standard, many applications will begin to take advantage of the 16-million-color palette. Assuming they are well-behaved applications, you should still be able to run them on an 8-bit board, meaning that you won't *have* to have a 24-bit board in order to work. But if you regularly view 24-bit images and have an Apple 13-inch color monitor, you should buy the ColorBoard. Even if you rarely need its 16 million-plus colors, you should still give the ColorBoard 264 serious consideration. It costs only a bit more than the Apple color board, is better designed, and you won't be left viewing grainy images in future applications.

—Cheryl England Spencer

See Where to Buy or circle 730 on reader service card.

STUDIO/1 1.0

Paint and Animation Program

Pros: *Easy to use; ingenious interface.* ***Cons:*** *Jerky paintbrush operation.* ***Company:*** *Electronic Arts.* ***Requires:*** *Mac Plus; second disk drive. System 6.0 and Finder 5.1.* ***List price:*** *$149.*

Only the most crotchety curmudgeon would fail to have fun using Studio/1, a black-and-white paint and animation program from Electronic Arts. In a world of copycat software design, interfaces cluttered with dialog boxes, and high-priced business programs, Studio/1 is a breath of fresh air.

Half of Studio/1 is a monochrome version of its powerful color-paint brother, Studio/8; these two programs share a number of innovative and creative touches. The other half is a full-fledged animation program, giving Studio/1 its own distinct personality.

Studio Lines

Plenty of paint (bitmapped graphics) programs have attempted to improve upon the original MacPaint's straightforward interface—usually with only partial success. The modifications to MacPaint tools that Studio/1 offers, however, are truly enhancements, actually making your graphics better-looking and easier to create than they would be in MacPaint.

For example, the ability to stretch, distort, and rotate a selected part of your drawing is nothing new. But the added ability to apply these special effects to a selection you've made with the lasso (instead of just the marquee) is welcome. Also, Studio/1 is the only paint program that lets you apply more than one transformation to the same selection. You can rotate something, then enlarge it, then distort it—without having to reselect the object.

Another example is Studio/1's Last Object -> Brush command; immediately after you draw an object, use this command to transform it into a paintbrush that you can use to paint, to create "rubber-stamp" copies, and even to save separately (for use in other documents, for example).

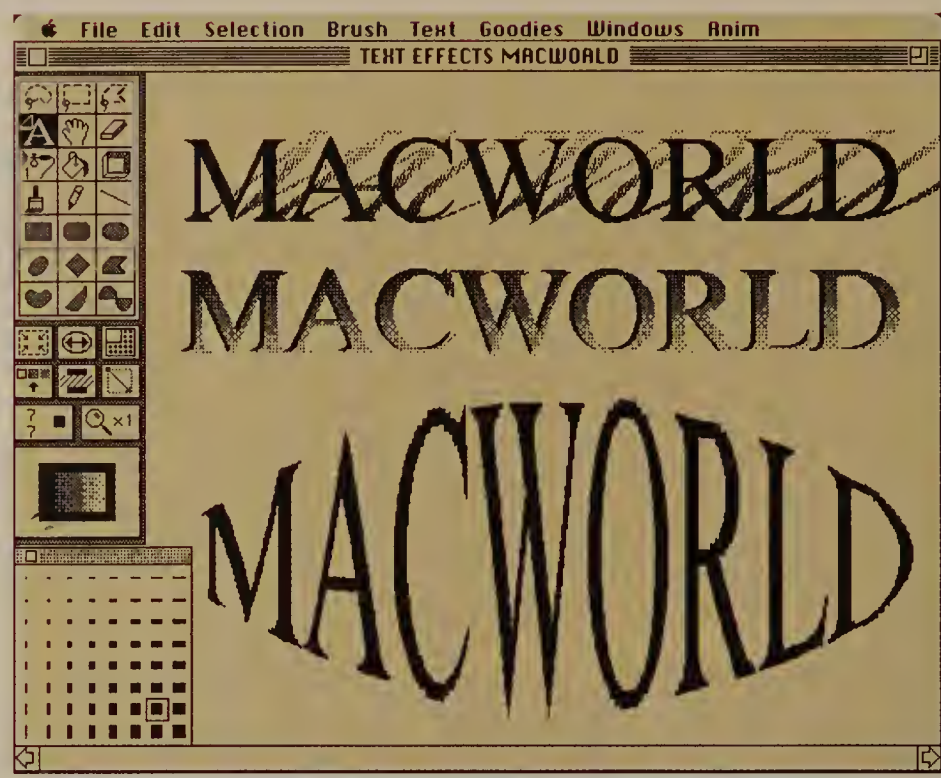
The quintessence of Studio/1's devotion to creativity, however, is an idea so obvious that its absence from other graphics programs suddenly seems like a startling omission: Use the keyboard! In most paint programs, you use the keyboard so rarely you might as well remove it entirely. In Studio/1, however, you can select a tool by pressing a key: L for lasso, B for brush, E for eraser, and so on. Because you can switch tools this way, you can use the full screen for drawing, without having to play hide-and-seek with the tool palettes every time you want to change tools.

Studio/1 makes ingenious use of other keys too. There are no key combinations to memorize for enlarging your drawing—just press the number key corre-

(continues)

sponding to the view you want: the 2 key for 2× magnification, the 4 key for 4×, and so on. As you're drawing you can also select patterns in the palette by pressing the arrow keys (even if the palette isn't visible). Furthermore, you can make these modifications in midstroke; for example, if you hold down one of the arrow keys while you're using the paintbrush, you paint a cheerful, variegated trail.

There is much more to be said about Studio/1's paint-program identity (see "Text Studio"). The interface is ideal: it includes tear-off palettes; superb radial and gradient fills (even within paintbrush strokes); a movable, resizable, hideable inset window (the actual-size-view miniwindow that appears when you zoom in or out); editing at up to 300 dpi; and the most intuitive solutions yet to such perennial interface dilemmas as line-thickness selection and copy modes.



Text Studio
These three examples demonstrate some of Studio/1's impressive special effects, which you can apply to text as well. What you can't tell from this illustration is that the letters in the top example were placed in Studio/1's special text layer, where text remains editable and laser printer compatible. The word MACWORLD prints at the full resolution of the printer—only its shadow is a bitmap.

Animatronics

While you're painting, you might not even notice the menu discreetly tucked at the right side of the screen, titled simply Anim. In this menu, however, are all the commands you'll need to access Studio/1's second half—its animation mode. If you've ever made a movie by drawing a little stick figure on each page of a penny pad and then flipping the pages, you already understand the principle. You simply choose the number of frames you want in your movie, tell Studio/1 how fast to flip them, and you're in business.

Studio/1 offers a number of tweening functions to help you create animations. You specify the status of an object in the first and last frames of a certain sequence, and the program computes the object's status in all intermediate frames. For example, Studio/1 can move an object smoothly from one position to another; it can apply any of a number of special effects to an object (spin it, distort it, or zoom it in or out, for 3-D effects). It can even transform one object into another; the dots that make up one shape visibly melt and re-form into a second shape.

Studio/1 also lets you create an animated paintbrush—a short sequence that runs over and over—that you can drag across the screen as Studio/1 flips pages. In other words, you might create a short animation of a woman taking one complete step, then make it into a paintbrush; as you drag this paintbrush across the screen, Studio/1 cycles through the step sequence repeatedly, leaving one image on each frame. You've just created a convincing animation of a woman walking across the screen.

For many desktop media purposes—slide shows, animated bar graphs, scrolling credits—these tweening features may be all you'll need. You have to wait a minute or so after using any of the tweening commands while Studio/1 performs the necessary calculations, but it's possible to generate professional animated slide-show presentations.

Studio/1 doesn't eliminate as much drudgery as it could, however. If you want to create true animated movies or storyboards, you'll have to draw one frame at a time, like a real animator (see "Bee Plus"). Studio/1 will copy static elements of your drawing (such as the background) to the appropriate frames, leaving you to complete just the portions that move, one frame at a time. (It won't show you what you drew on the previous frame, but you can flip back and forth easily.) If Studio/1's animation mode were as thoughtfully designed as its painting mode, you'd have the option of seeing your previous or next frame—perhaps as a dimmed image.

Depending on your ambitions, your creativity, and the number of objects that actually change from frame to frame, you

(continues)

Bee Plus
To create the flying bee in Studio/1, you need only to draw its wings moving over eight frames. Then you can turn the bee into an "animated paintbrush": drag the paintbrush across the screen, and the wings flap continuously, leaving one image on each frame. No computer in the world, however, could automatically animate the fellow below the bee—you'll have to draw him one frame at a time, just as a real animator would.

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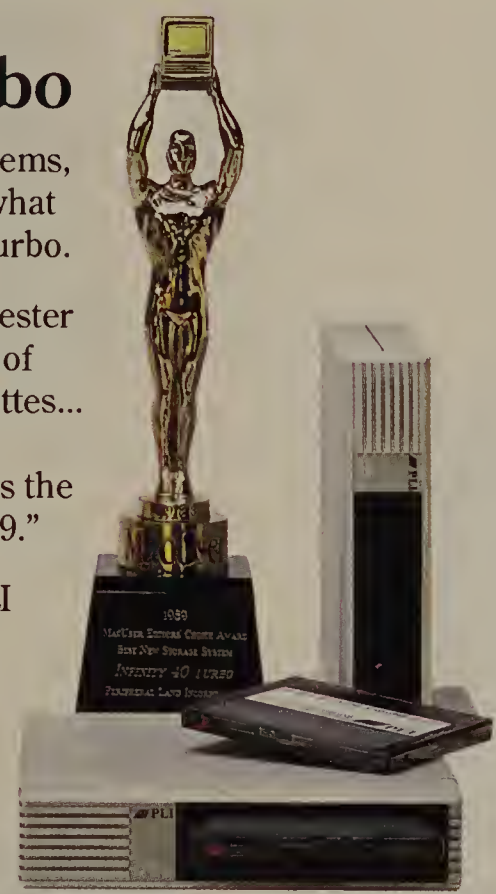

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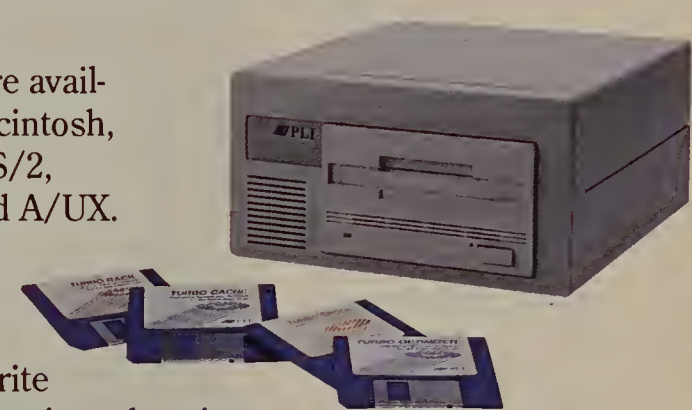
Interface kits are available for the Macintosh, IBM-XT, AT, PS/2, compatibles and A/UX. With a 650 MB single or 1.3 Gigabytes twin, you can write a lot again and again and again.



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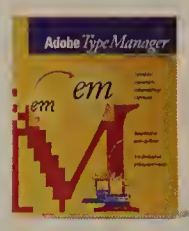

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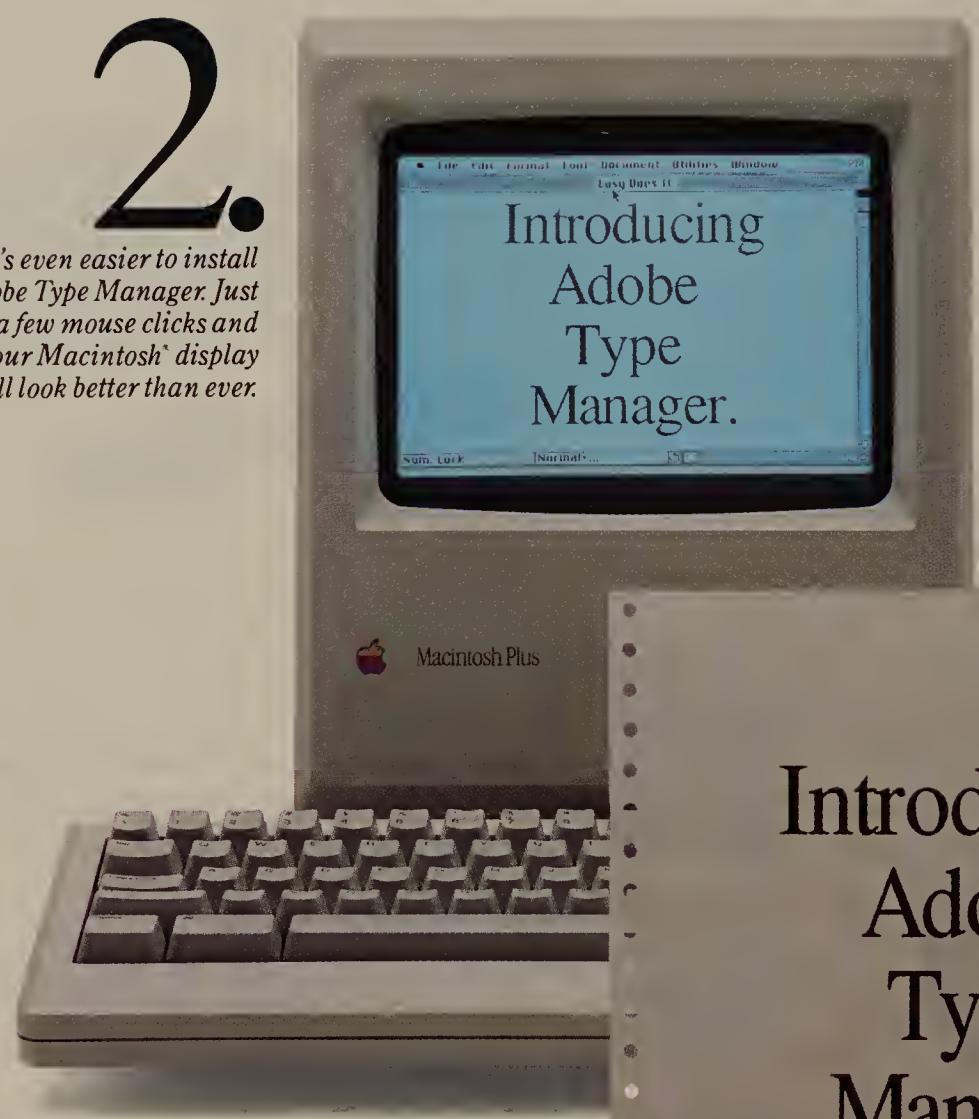

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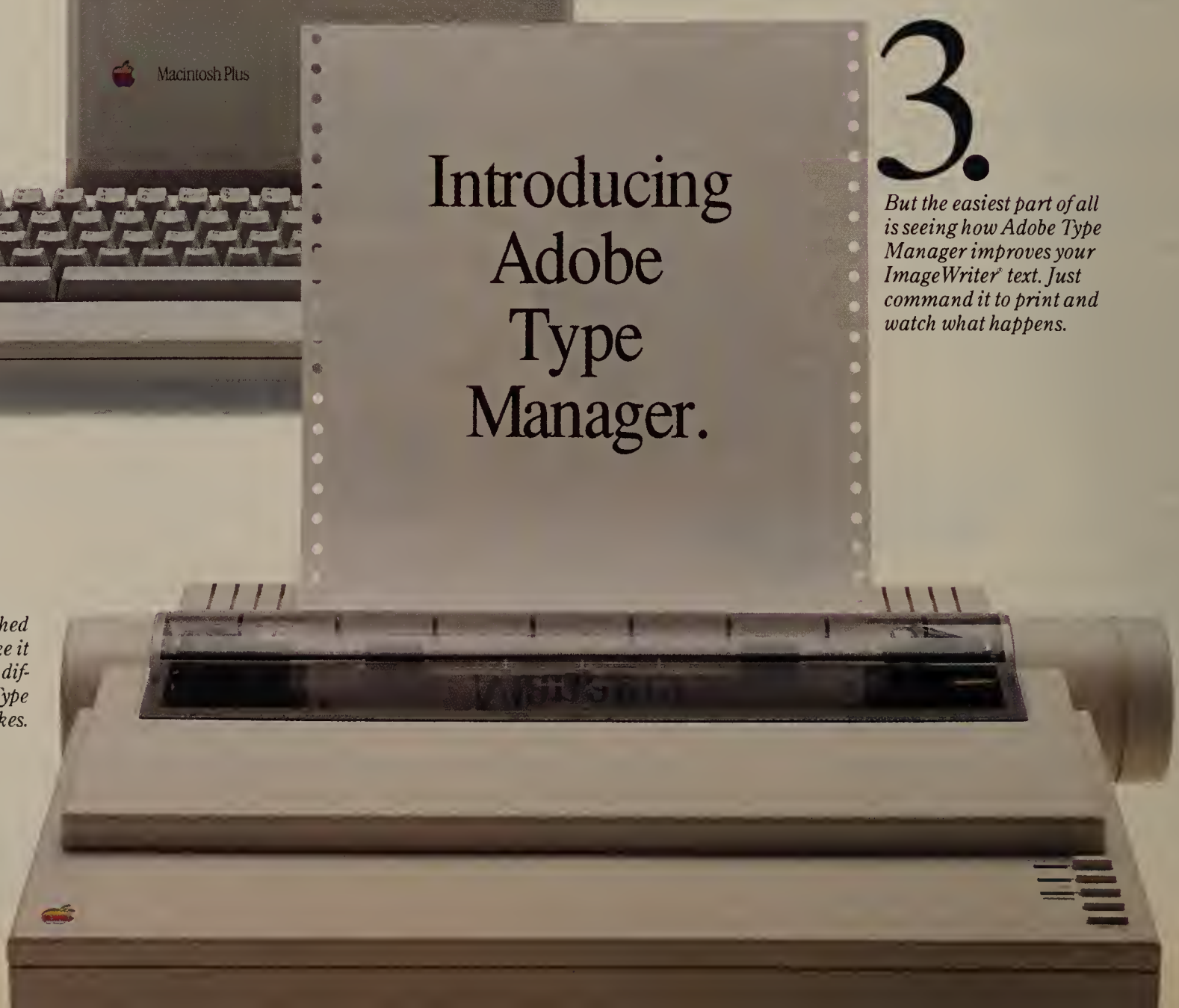
But the easiest part of all is seeing how Adobe Type Manager improves your ImageWriter® text. Just command it to print and watch what happens.



These unretouched photographs make it easy to see what a difference Adobe Type Manager makes.

Than Said.

IF YOU HAVEN'T read the page on the left, please do.

We'll wait.

Welcome back. You now know everything you need to know to use Adobe Type Manager.

But if you still need to know more, allow us to elaborate; although it's not going to be as easy as one, two, three.

Because to understand how and why Adobe Type Manager was created, you'll have to understand what came before it.

Prior to 1984, most people thought of computers as excessively complicated, overly technical and, in most cases, far too intimidating.

But that all changed with the computer called Macintosh.

The introduction of the Macintosh was followed a year later by the arrival of the LaserWriter®, the first laser printer to rely on a completely new "page description language." The PostScript® language from Adobe Systems.

Suddenly, the desktop publishing revolution was born.

Simply stated, PostScript stores descriptions of font characters as smooth outlines comprised of mathematical formulas, rather than the more typical bitmaps. So, no matter how jagged the type might look on a Macintosh screen, it comes out crisp and clean on a PostScript-equipped laser printer.

To say this new technology changed the face of computing would be a monumental understatement. Yet, the initial excitement about desktop publishing has now given way to higher expectations from Macintosh users everywhere.

Users just like you.

No longer is it simply enough to generate different type styles and sizes on your Macintosh display and printed pages.

You now want the text on your displays to be clear, smooth and legible. You want what you see on your display to correspond as closely as possible to what the printed page will look like. And, most importantly, you want to be able to print high-quality text on your low-cost printers.

Adobe Type Manager satisfies all those demands.

When added to your system software (System 6.0 or later), it builds individual characters at any size from PostScript outline fonts—the same fonts used by PostScript printers.

Adobe Type Manager is actually based on the PostScript language's capability to create and scale fonts to different sizes. So it's very fast and very compact.

And, at just $99, it's very affordable. In fact, at that price, Adobe Type Manager probably offers more value than any other Macintosh software.

It's also very easy to install and operate.

You see, Adobe Type Manager is completely transparent to both you and your software applications.

So all you'll see is a better image.

Once it's installed in your System Folder, Adobe Type Manager intercepts QuickDraw™ font requests and generates the screen bitmaps (at the requested size) from a PostScript outline font. So, whether your text is regular, bold or italic, it looks smooth and readable from the largest point sizes to the smallest.

Then, when you print to your Apple ImageWriter or Hewlett-Packard DeskWriter, Adobe Type Manager automatically generates the requested printer font bitmap to produce beautiful, letter-quality text from any application.

That's because Adobe Type Manager is compatible with virtually all major Macintosh software—from programs for word processing and spreadsheets to page layout and presentations.

Which means it won't change the way you work.

Just the way you look.

And every Macintosh user can look better, because Adobe Type Manager requires just one megabyte of memory. That way, every Macintosh from a Plus to a IIcx can take advantage of its unique outline font technology.

Speaking of fonts, every copy of Adobe Type Manager includes high-quality outline versions of the 13 most popular fonts. They'll enable you to produce the kind of high-quality text from your ImageWriter or DeskWriter you thought only came out of a laser printer.

If you want to add more fonts, you can pick up the ATM™ Plus Pack, giving you the 22 additional outline fonts from Apple's LaserWriter IINT and IINTX laser printers. And, until December 31, 1989, ATM Plus Pack is priced at just $198.

Adobe Type Manager also works with other Adobe PostScript language fonts, including the more than 500 typefaces from the Adobe® Type Library.

We could go on, but you probably have the picture by now. Suffice it to say, Adobe Type Manager is a lot better to look at than it is to read about.

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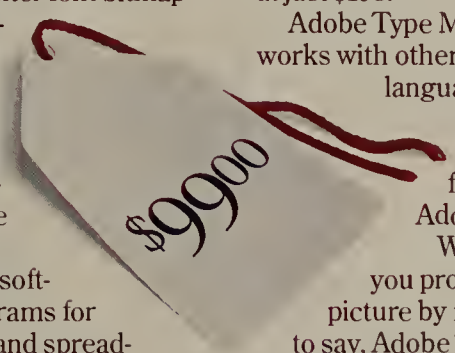
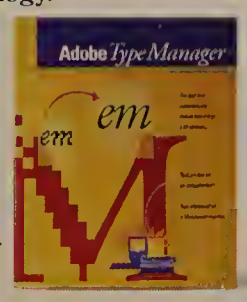
(Far Left) *Currently, the majority of personal computers, including Macintosh, store text characters as a pattern of dots (known as a bitmap).* (Middle Left) *But outline fonts—which were pioneered by Adobe—store the shapes of each character as easily-modified mathematical formulas.*

(Middle Right) *Scaling a bitmapped font is a less precise process, making the character less accurate and more difficult to read.* (Far Right) *When an outline font is used, the computer scales the outline to the precise size and shape, and fills it with dots. This results in a smoother, more accurate character.*





Times*
Roman, *Italic*, **Bold** & ***Bold Italic***

Helvetica*
Regular, *Oblique*, **Bold** & ***Bold Oblique***

Courier
Medium, *Oblique*, **Bold** & ***Bold Oblique***

Symbol
ΑΒΧΔΕΦΓΗΙϑΚΛΜ ΝΟΠΘΡΣΤΥς ΩΞΨΖ

Adobe Type Manager includes high-quality outline versions of these 13 most popular Macintosh fonts. You can also add any PostScript outline fonts, including those from the Adobe Type Library.

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may have to keep an eye on the on-screen memory gauge while you work. With a 2MB Mac, for example, it is possible to run out of memory after creating only 300 complex frames. (If you set the playback speed to 24 frames per second—a standard speed for smooth, convincing animation—such a movie would last for about 12 seconds.)

Seconding the Motion

Still, there's no debating the fact that Studio/1's animation features are easy to learn and fun to use. You don't have to be concerned with sprites, casts, and scores, as you do in the comparatively tedious VideoWorks II, for example; Studio/1's approach is far more intuitive. Yet you can create simply spectacular effects, including sound and visual effects, gradual acceleration of objects, and images that spin, fly, recede into the distance, and leave dusty trails of pixels behind as they move.

You can export your animations to either a HyperCard stack (to make that corporate logo dance) or to a program called Gallery, that's provided with Studio/1. In Gallery, you can chain either single-screen paintings or full animations together into a slide show. You can either conduct the show with the mouse or let it run automatically, much as you would with a presentation package—the difference is, of course, that a Gallery show can include animation and sound effects.

Studio/1-derful

There's only one significant flaw in Studio/1. The paintbrush—that most fundamental of tools—moves in short bursts, so that it leaves a crooked, slightly segmented stroke instead of a smooth, continuous one. This oversight is strikingly out of place in a program that evidences so much loving attention to detail.

With that exception, however, Studio/1 is a splendidly crafted program with plenty of spirit. A case in point: if you ask the Electronic Arts spokespeople what the program was designed for, you might be surprised. "You can use it for almost anything," they'll say, "but really it's just a lot of fun." And you know, they're absolutely right.—*David Pogue*

See Where to Buy *or circle 878 on reader service card.*

Erasable Optical Disk Drives

REO-650

Pros: *Solid; smooth; worry-free; Sony format holds extra 50MB per disk.* ***Cons:*** *Industrial-looking; more expensive than other drives.* ***Company:*** *Pinnacle Micro.* ***List price:*** *$4995; Macintosh interface $495; extra cartridge $250.*

JASMINE DIRECTOPTICAL

Pros: *Well-equipped back panel; solidly built.* ***Cons:*** *Nonintuitive software; inadequate manual.* ***Company:*** *Jasmine Technologies.* ***List price:*** *$4995; extra cartridge $298.*

GENESIS 6000

Pros: *Sensible, simple software.* ***Cons:*** *No eject button; internal termination and SCSI address control.* ***Company:*** *Macsetra Technologies International.* ***List price:*** *$4995; extra cartridge $250.*

SUMO OPTICAL DISK DRIVE RSSM 600B

Pros: *Superior, trouble-free software; external termination switch.* ***Cons:*** *Inadequate manual; stand-beside model can't be daisy-chained.* ***Company:*** *Sumo Systems.* ***List price:*** *$4595; extra cartridge $260.*

CIRRUS 600 MAGNETO OPTICAL DRIVE

Pros: *Flexible, friendly software; price includes Mac Plus.* ***Cons:*** *Requires two-hour formatting process.* ***Company:*** *La Cie.* ***List price:*** *$4995; extra cartridge $249.*

Erasable optical disks are now available for the Macintosh, and they're going to be terrific. Imagine 300 megabytes *per side* of a fast, sturdy, removable disk with a 15-year shelf life. Imagine optical disk drive units as small as hard disks, but quieter. Imagine working with huge graphics, music, and database files without ever having to worry about running out of storage room, because you can always buy another disk for 40 cents per megabyte (versus $10 to $20 per megabyte for a hard disk).

However, if you want to own an early optical disk unit (or *floptical,* as they're sometimes known), you'll have to pay an inflated price for the privilege. You'll also have to endure the trials of shaky and still-evolving controller software. And perhaps worst of all, there's a possibility that you'll get caught in the cross fire of the major optical disk manufacturers, who are waging a war to establish their own drive format as the standard—a replay, some say, of videotape's VHS/Beta format struggle.

Nonetheless, the technology itself is thrilling: the first five units that have been introduced—by Pinnacle, Sumo, La Cie, Jasmine, and Macsetra—are tantalizing previews of the quick, inexpensive, solid optical drives to come.

Optical Options

It's entertaining to see each company's conception of what a standard optical drive should look like. The La Cie and Macsetra units resemble stocky hard disks, and sit under the Mac SE. The Jasmine drive (being marketed for Racet) looks like an elongated shoe box; it fits neatly next to a Mac II but looks a little ungainly next to an SE. Sumo gives you a choice of format; you can get either an under-the-Macintosh or a stand-beside unit, a fascinating reincarnation of the case the Mac-Charlie (an IBM-to-Mac disk drive unit, no longer manufactured) used. The Pinnacle unit is square and massive-looking, making no attempt to blend in with the Macintosh beside it.

The erasable optical disk (cartridge) itself is an enlargement of a standard 800K floppy disk, complete with oversize sliding metal shutter and write-protect tab. Although each disk holds about 600MB, manufacturers' claims for this much on-line storage per disk are somewhat misleading, since you must eject the cartridge and physically turn it over in order to access the data on side B.

Optical disk technology is extremely sophisticated; it involves a laser beam's heating the surface of the disk as it spins at 1800 rpm. The access times of all of these units are perfectly acceptable—about 35 percent slower than a hard disk, but faster than floppy disks, and much

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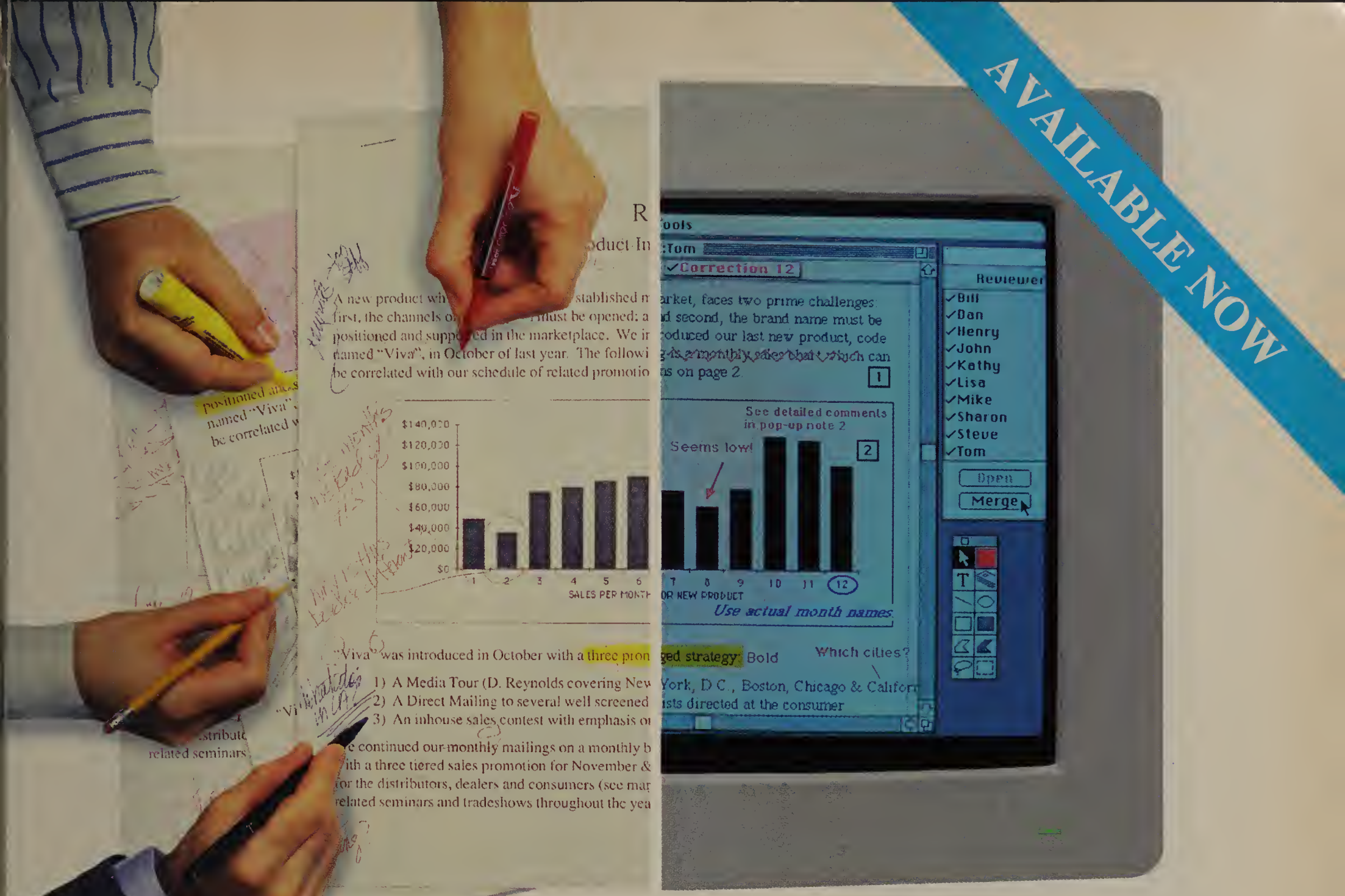

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faster than CD ROMs. In other words, an optical disk drive provides the massive storage capacity of a CD ROM system without the associated sluggishness—and what's more, you can fill an optical disk with your own data. You can erase and rewrite data up to a million times (unlike WORM drive disks, which you can't erase once you've stored data on them).

OEM, ANSI, Etc.

The optical disk industry operates much like the hard disk industry: only a few companies actually produce the high-tech innards of the drives. You can't buy a complete drive from an OEM (original equipment manufacturer); instead, you buy the unit from a vendor, who's responsible for adding the fan, housing, controller software, and manual.

Although Sony and Ricoh are currently the only OEMs in the Macintosh optical disk market, others are soon to begin production. When you buy a Pinnacle optical drive, you're buying a Sony mechanism. Ricoh provides the optical disk mechanism for the Macsetra, Sumo, La Cie, and Jasmine units.

Sony proudly claims that only its drives meet the ANSI standard—an optical disk format for which Sony cowrote the guidelines. Ricoh doesn't meet this standard; therefore, says Sony, as optical disks grow in popularity, owners of Ricoh-based units are likely to be stranded on an island of incompatibility.

The irony, however, is that the less expensive and more widely marketed Ricoh drives seem to constitute more of a standard. You can swap cartridges among the La Cie, Macsetra, Jasmine, and Sumo units—but only a Pinnacle can read a cartridge from a Pinnacle. Furthermore, Ricoh is reported to be considering a format change that would make its drives compatible with Sony-based drives after all—a change that would require current Ricoh drive owners to get their units upgraded (probably at no charge).

Pinnacle at the Top

The best optical disk drive of the bunch is the Pinnacle. You pay $500 more than for the highest-priced Ricoh drive (to cover the cost of an Orwellian-sounding Personality Adapter kit), but you receive a unit with more of the kinks ironed out.

You also get the Sony optical disk format, which offers certain advantages, including a slight overall speed advantage. Each cartridge, for example, gives you an additional 25MB of storage per side; though the actual cartridges are identical, a Sony-formatted cartridge holds 309MB per side, and a Ricoh-formatted cartridge holds *only* 284MB.

Even more important, the Pinnacle's controller software (a small INIT file) is smooth and intuitive. You put a cartridge in the machine—its icon shows up on the desktop. Drag the icon to the trash—the cartridge is ejected. Furthermore, a Pinnacle cartridge (and cartridges from some of the Ricoh units) comes preformatted and ready to use. That's a big plus, since it takes about two hours to initialize a brand-new optical disk.

Is the extra smoothness and solidity of the Pinnacle optical drive worth an extra $500? Probably, especially if you need to buy one soon. All optical disks will eventually drop in price; meanwhile, the software provided with the Pinnacle's competition is likely to improve. For the moment, however, the Pinnacle is at the top of the heap.

Ricoh Roundup

The four Ricoh-based machines are nearly silent and performed almost identically in benchmark tests. And all, except the Jasmine, can recognize data on cartridges that have been formatted in other Ricoh units.

The software for the Jasmine is a letdown, despite the fact that it can perform partitioning (a feature no other unit but the La Cie offers). You can specify which of your partitions appear on the desktop when you turn on the Mac. If you insert a cartridge after the Mac is already on, however, nothing appears on the desktop. To make the cartridge's icon appear in this case, you use an F-key for which no installation software is provided. To eject the cartridge, you drag the icon to the trash; the manual instructs you never to use the Eject command (⌘-E) in

(continues)

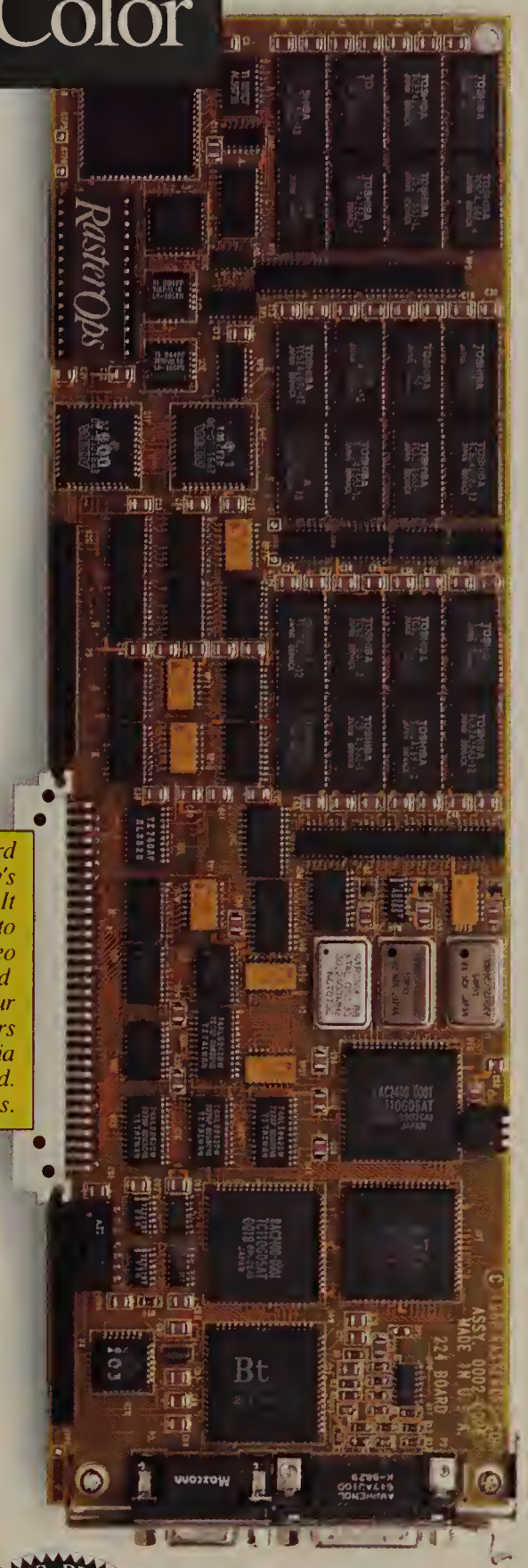
TOP OPTICALS

	800K Floppy	Jasmine DirectOptical	Macsetra Genesis 6000	Pinnacle REO-650	SumoOptical Disk Drive RSSM 600 MB	La Cie Cirrus 600	Quantum 80MB hard drive	Hard Disk Speed Advantage over Sony	Hard Disk Speed Advantage over Ricoh
OEM		Ricoh	Ricoh	Sony	Ricoh	Ricoh	Quantum	n/a	n/a
Megobytes per side	0.08	284	284	309	284	284	84	n/a	n/a
SCSI Address		Pushbutton	Internal	DIP Switches	Pushbutton	Pushbuttan		n/a	n/a
Terminator		External Block	Internal	Externol Black	External Switch	Externol Block		n/a	n/a
Finder-Duplicate 1MB file	46.9	9.0	10.1	7.6	9.4	9.3	3.7	61%	51%
Extroct 1MB Stuffit file	n/a	114.0	115.0	154.0	114.0	114.0	48.0	58%	69%
Launch Ward file	9.6	9.0	9.7	9.5	9.1	8.7	7.5	18%	21%
Search in 200-page Ward file	20.5	44.4	53.0	18.4	43.6	44.0	7.7	83%	58%
Scrall through 200-page dacument	113.0	104.0	131.0	88.0	110.0	110.0	71.0	37%	19%
Save os	72.0	39.0	41.0	32.0	39.0	39.0	24.0	39%	25%

All times are in seconds.

RasterOps Professional 24-bit Color

The best 32-bit Color QuickDraw card that you can buy: The ColorBoard 224.



This board sets the standard for 24-bit Macintosh® color. Drive a variety of monitors, from Apple's® affordable 13", up to our professional, 19" Trinitron. Accelerate your work with selectable bit modes — from 1-bit to 24-bit. Use the full 1024 x 1024 in 24-bit mode resolution with our built-in pan and zoom features — no matter what size monitor you choose. And when you get ready to move into desktop video, just add our SFX™ Video System to the built-in adaptor, and you have a video studio.

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Your ColorBoard 224 directly supports Apple's DirectSetEntries and SetGamma QuickDraw instructions in hardware. Instantly see the effect of changes to your color image. You can watch the color tones change as you move the mouse. Without this dynamic support, you have to guess at the color correction, enter the new value, and wait for the new screen to repaint. No waiting with the 224.

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MARK JOHANN

The Sumo Optical Disk Drive RSSM 600B (upper right) and the REO-650 from Pinnacle Micro, Genesis 6000 from Macsetra Technologies, the Cirrus 600 Magneto Optical Drive from La Cie and the Jasmine DirectOptical (shown clockwise).

the Finder since you risk losing data (a particularly unfortunate bug for an ejectable-disk system).

For some reason, documentation seems to be a low priority for every early manufacturer of optical disks, and the Racet manual provided with the Jasmine drive is no exception. You get a series of pages that seem to have been photocopied from a hard disk manual and have little to do with the optical disk. In fact, at one point you're referred to an illustration that turns out to be a blank rectangle containing only the words *paste art here.*

In spite of these shortcomings, the Jasmine unit works as smoothly as any of the other Ricoh units. The back panel has all the premium features: you can set the SCSI address easily, add an external terminator, and even plug in the Macintosh (a switched outlet is provided). The Jasmine unit is the only one that comes with a free cartridge, too. For the moment, however, you can buy a less expensive unit with equivalent performance and much better software.

6000 Disappointments

Although the software provided with the Macsetra Genesis 6000 doesn't share the inconveniences of the Jasmine software, the drive itself is somewhat lacking. Unlike every other optical drive on the market, for example, there's no eject button on the face of the unit itself. Furthermore, its termination and SCSI address controls are internal; you have to dismantle the drive to change either of those settings.

There's something peculiar about Macsetra's formatting, too. Even after the disk had been prepared with the two-hour "certification" process recommended by the manual, the Macsetra unit was slower in every benchmark—sometimes substantially so—than the other Ricoh units. (The figures in the table reflect postcertification benchmarks.) Despite its smooth and worry-free software, this speed deficiency and the drive's poor hardware design make it look weak next to the other Ricoh units.

Sumo of its Parts

Sumo's unit is a better all-around choice. You probably won't notice it even has software, because the tiny INIT is completely transparent. Each cartridge is treated exactly like a floppy disk—Sumo's is the only software that displays a "This disk is blank" dialog box when you insert an unformatted cartridge. You simply click the Initialize button to format the disk; the process takes about eight minutes a side.

The Sumo's under-the-Mac model is compact and clean-looking, and it has a feature all other drive manufacturers should sit up and notice: a termination on/off switch. In other words, you can terminate a daisy-chained SCSI setup just by flipping a switch (instead of plugging in a physical termination block—or worse, opening up the case). The unit works well and is the least expensive optical drive.

La Cie Plus a Plus

If you're value-conscious, however, you'll be hard-pressed to beat La Cie's optical disk promotion. At this writing, the unit costs about the same as the other Ricoh units—but La Cie sweetens the deal by throwing in a free Mac Plus if you purchase the drive from a Businessland computer store.

That bonus wouldn't matter much if the drive weren't so good. Fortunately, the software is good, too; it recognizes cartridges that have been formatted on any other Ricoh unit and even recognizes the partitions on a Jasmine-formatted cartridge. SilverLining, the utility program provided, offers flexible partitioning capabilities, including the ability to resize partitions without destroying existing data. The program has built-in backup and defragmentation modes, too.

At this writing, however, the La Cie unit provides no manual at all, and the only way you can format a blank cartridge is to perform the full two-hour initialization routine. (La Cie claims that it will soon be preformatting its cartridges.)

Optical Nerves

There's something about seeing "250,000K available" at the top of a Finder window that makes working with any of these drives a giddy experience. But both the industry and the marketplace are still budding. So if you need an optical drive now, be prepared to suffer the hazards of poor documentation and rudimentary controller software.

If your color graphics, digitized sound, or database files require massive amounts of inexpensive storage, however, an optical disk drive may be a necessity. But consider both the price and the OEM of the unit you want, because the actual differences in the mechanisms are very slight. The Pinnacle is the premium optical disk drive, with a premium price tag—it's a Sony; both the Sumo and the La Cie units show promise as well-priced Ricoh-based products. If you buy one now, you'll be happy with any of these three models. And if you decide to wait until the prices drop and the market settles, be of good cheer—you have a lot to look forward to.—*David Pogue*

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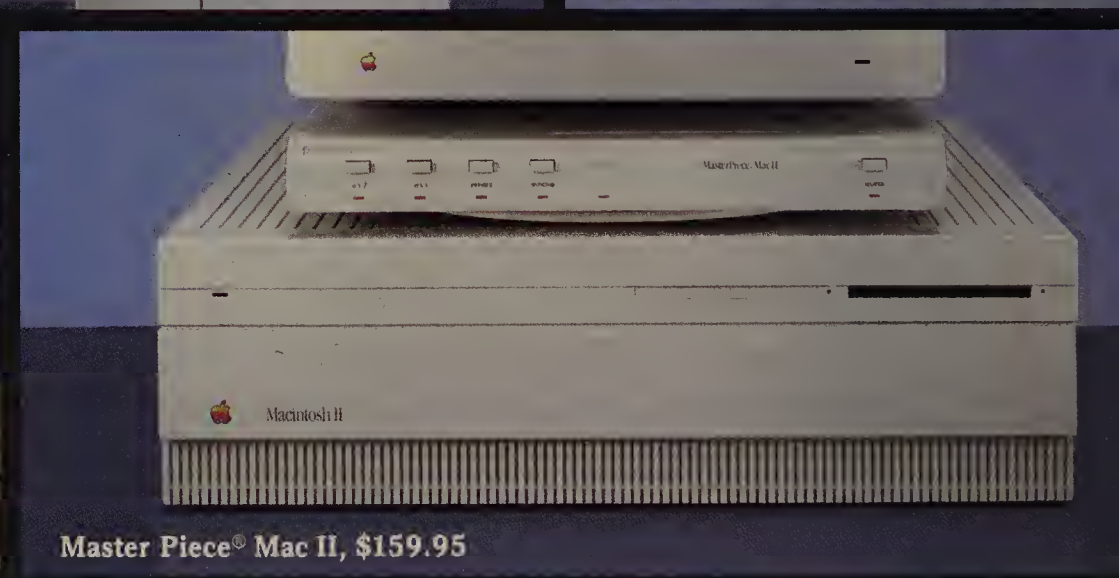

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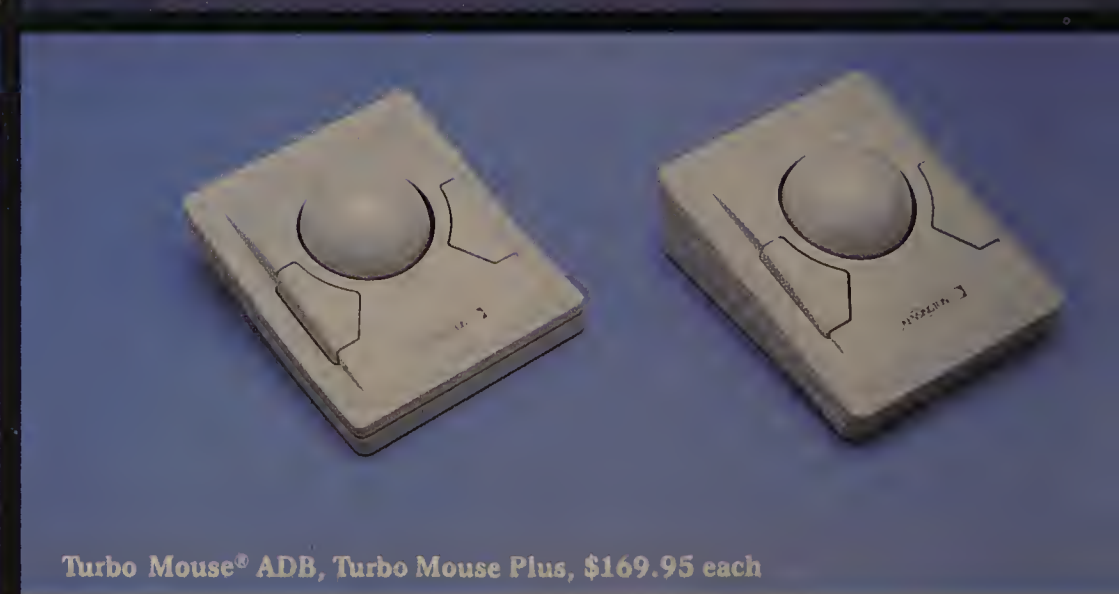

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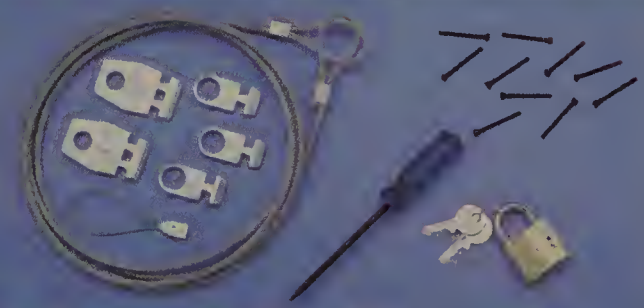

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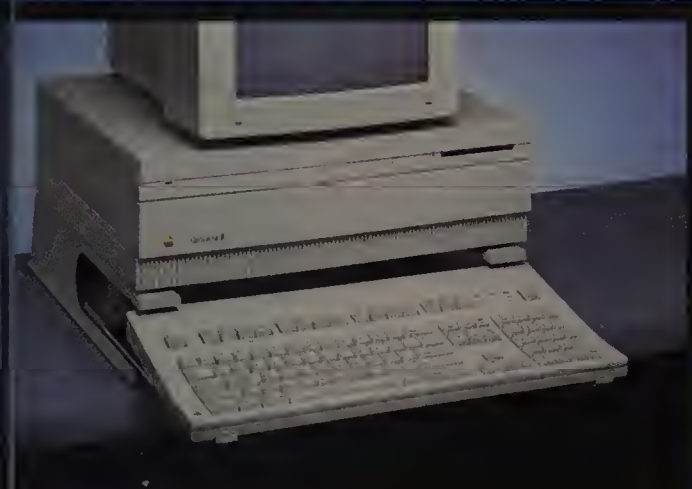

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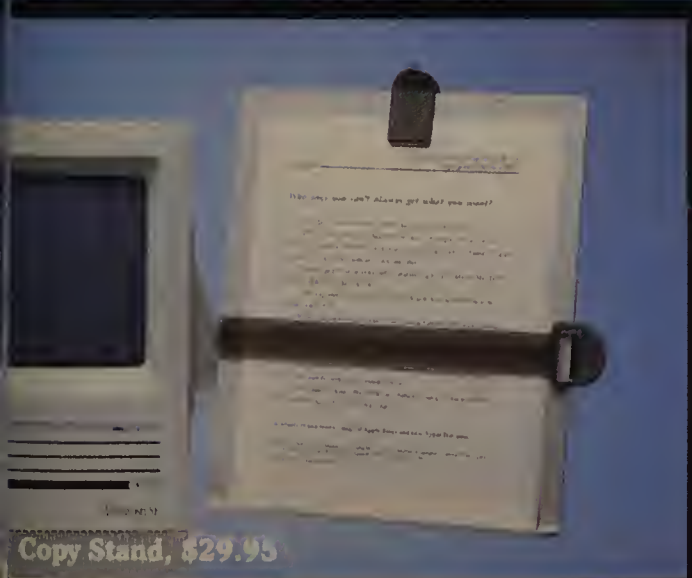

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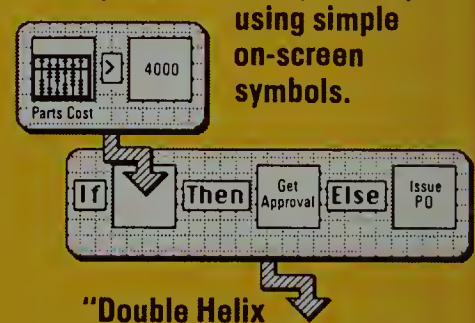

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Equation Editors

EXPRESSIONIST 2.0

Pros: *Excellent balance of features and simplicity; good ImageWriter support; DA version included.* ***Cons:*** *Not for casual users; leisurely local database performance.* ***Company:*** *Allan Bonadio Associates.* ***Requires:*** *Mac 512KE.* ***List price:*** *$129.95.*

FORMULATOR

Pros: *Easiest for occasional use; intelligent interface implements standard typesetting conventions.* ***Cons:*** *No macros; no DA version; locks some symbols.* ***Company:*** *ICOM Simulations.* ***Requires:*** *Mac 512KE.* ***List price:*** *$149.95.*

MATHTYPE 2.0

Pros: *Most capable for heavy-duty publication chores; good macro support; DA version included.* ***Cons:*** *Longer learning curve; no built-in TEX translator.* ***Requires:*** *Mac 512KE.* ***Company:*** *Design Science.* ***List price:*** *$149.*

The Mac has always been considered an ideal tool for producing documents that require mixed text and graphics, such as those for mathematics and chemistry. Compared to other techniques for producing typeset-quality equations (the TEX language or the command scheme in Microsoft Word), all three equation editors reviewed here are delightfully straightforward and almost fun to use. Each has a remarkably different personality—surprising for applications devoted to nearly identical tasks.

Expressionist

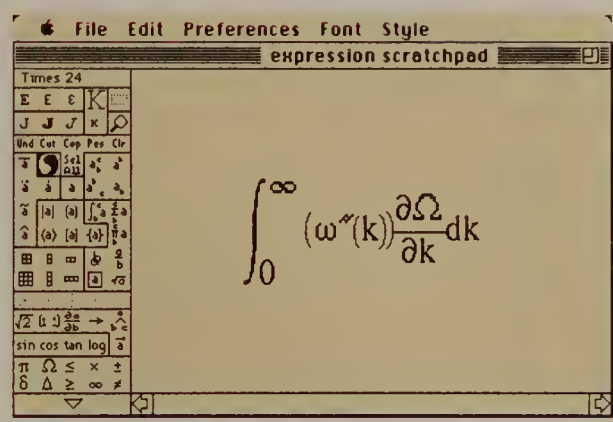
Expressionist, in its earlier versions, was the best-selling equation editor. Version 2.0 fixes the handful of complaints mentioned in an earlier review (*Macworld*, April 1988) without complicating its self-explanatory interface. You still simply find and click on the symbols you want in the palette, but now the palette scrolls (see "Expressly for You"). The updated palette also has space for ten user-defined icons that control macros for complex expressions. A Tweak function supports micropositioning of characters and groups of symbols, and a Preferences menu allows you to modify program defaults for spacing and other actions.

With a little practice, you can learn to write equations in Expressionist with dazzling speed. It's also particularly convenient for use with Microsoft Word, since you can invoke Expressionist as a desk accessory and it does a creditable job of translating its own typesetting directly into Word commands. Although the translation to Word commands or to TEX isn't always perfect, the manual gives some reasonable guidelines for ironing out occasional problems. Extra attention given to such details as printing with ImageWriters is probably another reason for the popularity of this program among students. The manual is eccentrically organized but highly informative and packed with tips. Telephone support is almost fanatically competent, replete with apparently irrepressible suggestions about more effective use of the program. As an equation editor for frequent personal use, Expressionist 2.0 is an excellent choice.

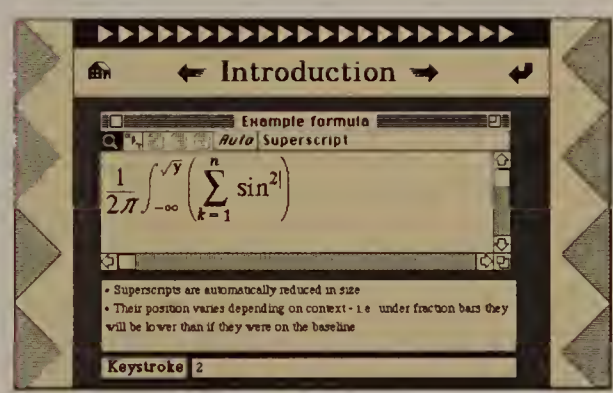
Formulator

Formulator was available in England before being imported recently by ICOM simulations, developers of the TMON debugger and assorted games. Formulator features the plainest opening screen of the three programs reviewed here; most details are hidden in menus. Fortunately, a well-organized tutorial explains how to find palettes of math symbols, Greek characters, and grouping and alignment functions (see "Learning to Formulate").

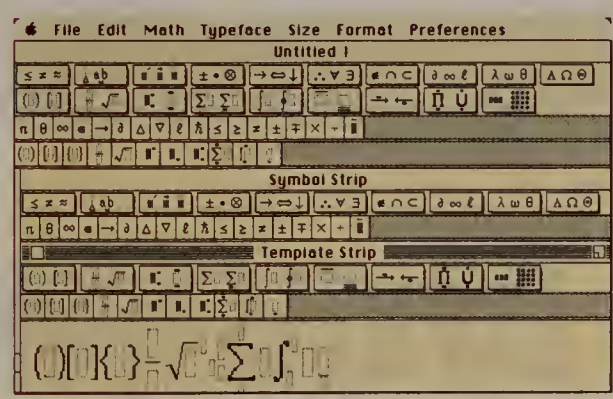
A key feature of Formulator is the Auto Style function, which adjusts symbols in accordance with math typesetting conventions. The program knows, for example, that variables in function expressions are typically italicized, that operators need different spacing from function names, and that all sorts of spacing and positioning are context dependent. Formulator has a long list of typographical rules that set defaults for equation layout. You can override these, but they give harmonious, professional-looking printed output, even in the hands of users with a manifestly deficient aesthetic sense.



Expressly for You
Expressionist 2.0 is mainly operated through the symbol palette at the left of the screen. You simply select the series of symbols you need in your equation. The symbol palette scrolls, allowing a wider range of selections.



Learning to Formulate
One of Formulator's strongest points is a HyperCard-based tutorial. It steps you through enough of the program's features that you can do most equation-writing tasks after 15 minutes or so.



Prose and Icons
MathType allows you to open separate windows for selecting nearly any math symbol from its multiple palettes. Frequently used combinations and custom symbol modifications can be stored as macros.

These are Formulator's strengths: with the tutorial you can learn the program in 10 to 15 minutes, and the intelligent defaults let you produce decent output without much practice. It also gives error-free TEX output.

(continues)

Illustration created in Swivel 3D by Joe Sparks.

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Formulator is the editor of choice if you work with equations only occasionally, since you can relearn it in a few minutes. If you do lots of equation editing, you will find it slower than Expressionist and lacking some expected high-end touches found in the other two products (tensor symbols, for example—a remarkable omission in a program endorsed by Stephen Hawking's famous general relativity research group at Cambridge University). You can also establish four user-defined complex commands, but the lack of a proper macro facility will dismay advanced users.

MathType

MathType 2.0 is designed for more advanced equation editing. It would easily be the first choice for the secretary of a large mechanical engineering department in a university, but it's a bit complex for an undergraduate in the same department trying to write a term paper in a hurry. This complexity is reflected in its size—265K (it can be used as a bulky DA) compared to Expressionist's 136K. As further evidence of its professional orientation, MathType files can be saved in encapsulated PostScript format, converted for use with Design Science's MS-DOS MathType, and transferred to Mathematica format with an optional translator that's scheduled for release by year's end.

The program is an extreme example of the icon-driven approach, offering an icon for every symbol and nearly every symbol combination, to the point that sometimes it becomes difficult to distinguish among the tiny, complex icons (see "Prose and Icons"). The symbol tiles in the first two rows are in fact designations for further menus of symbols. Although keyboard equivalents on the screen are available for many operations, they are not particularly intuitive in terms of the Macintosh interface (⌘-/[slash] for Save, for example).

Nonetheless, for users whose main concern is production of technical documents, MathType offers unique attractions. Its expression macro facility rates best for storing and recalling complex expressions. The program offers delicate and easily specifiable control, to 1/32 of a point, over general symbol positioning and the default position of superscripts and subscripts in each available font. As it happens, however, the automatic spacings are probably sufficient for most purposes. If you do enough equation work to repay the effort, you can also customize most of the items on symbol palettes. Thus, although the program's sheer size means that it is not the most efficient for occasional use, it can be optimized by experienced users until it surpasses all other equation editors for convenience.

In Sum

Six years ago, a graduate student in physics would have thought any such program an utter miracle, so if someone gives you one of these programs as a graduation present you'll be fortunate to have everything you are likely to ever need in equation editing. If you're spending your own money, consider how often you need to do this work and select friendly newcomer Formulator, mainstream choice Expressionist, or professional MathType as your needs dictate.—*Charles Seiter*

See Where to Buy or circle 756 (Expressionist), 768 (Formulator), or 831 (MathType) on reader service card.

XTREEMAC 1.0

Hard Disk–Management Utilities

Pros: *Easy-to-understand, tree-structured file display; multiple selections can include any files and folders on the same disk; comprehensive online help.* ***Cons:*** *Many file-management functions outperformed by other utilities; requires at least 512K under MultiFinder; crashes occasionally under MultiFinder.* ***Company:*** *XTree Company.* ***Requires:*** *Mac 512KE.* ***List price:*** *$99.*

As with the fabled search for a better mousetrap, the search for better hard disk file-management software has proven irresistible to many developers. Only a few such programs, including CE Software's DiskTop DA and Fifth Generation's highly customizable PowerStation, have caught on with Mac owners. Now comes XTreeMac, from the publisher of one of the most widely used disk-management programs for IBM PCs and compatibles.

MARK JOHANN

A Tree of Folders and Files

The two parts of XTreeMac's main window feature some of the program's major file-management functions. One section on the left displays the contents of the currently selected disk volume as a structured tree (much like the display in competitor MacTree Plus from Go Technology). Lines branch to folders, files, and applications from the folder that contains them, providing a more graphic view of disk organization than that offered by the Finder (see "A Tree Grows").

Like the outline created by an outline program, the file tree can be expanded to a selected level, or selected portions can be expanded or collapsed as desired. You can elect to hide documents or applications, show invisible files (such as the Desktop file), or create special file filters that hide everything except word processing files, for example. XTreeMac lists applications, files, and folders at each level in alphabetical order only; you cannot rearrange them by size or date, nor can you create an arbitrary order, the way you can with icons in the Finder.

You rename or trash files and folders much as in the Finder. Moving or copying items is often much easier than it is in the Finder, since you can drag items from folder to folder, or even volume to volume, without opening, closing, or moving windows. (You can also copy or move files using menu commands, which allow you to select a destination from a standard Save dialog box.) You can also select any

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combination of files and folders from anywhere within the same volume at one time, making it easy to effect major reorganizations with a single move. You can also print (or save as a disk file) the currently displayed file tree, a catalog of all the files in the tree, or a floppy disk label with a spine title and a list of files.

A Scratch Pad for File Management

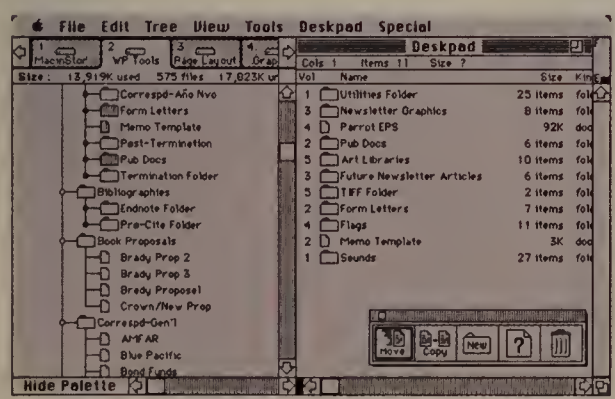
Only one file tree, and thus only one disk volume, can be displayed at a time. If you wish to view files or folders from several different disks or partitions at once, you must use the Deskpad, the scrolling file list on the right side of the XTreeMac window. Any item from any file tree can be dropped into the Deskpad; the original file or folder actually stays where it is, while an image of the file appears in the Deskpad. The files and folders in the Deskpad can be sorted in ascending or descending order by name, date, size, kind, color, or volume. The Calculate Size command tells you the total disk space occupied by all the files in the Deskpad.

As a temporary holding and sorting shelf for files and folders you want to move or copy, the Deskpad works well. But it has drawbacks. The Find On Tree command should help you relocate a selected Deskpad file's position, but it doesn't always work. And once you open a folder in the Deskpad, there's no easy way to put all its files back.

Beyond File Management

XTreeMac's Get Info window displays, in addition to the usual information, the file type, creator, and other file attributes, and allows you to change them (if you dare). There's extensive online help. And a feature called Revive-a-File, which must be installed on each disk you want to use it with, makes it easy to retrieve files thrown in the Trash—even after you've emptied the trash. On the other hand, although XTreeMac's Find File command is more discriminating than Apple's Find File desk accessory, it is far less powerful than the file-finder portion of CE Software's DiskTop. And a number of procedures, including creating a new folder, can get unnecessarily complex. Also, XTreeMac searches a hard disk only one partition or volume at a time; you must select each volume to be searched.

XTreeMac incorporates most other Finder functions, including Restart and Shut Down, and can be used as a Finder substitute as well as a file manager. Double-click on an application appearing in the file tree to launch it; XTreeMac returns when you quit. Commonly used applications and documents can be added to a menu for quick access. To use XTreeMac as an application under MultiFinder, however, requires at least a 512K partition: a high price to pay for file management. And you must beware of a few bugs that can cause XTreeMac to quit unexpectedly under MultiFinder.



A Tree Grows

Clicking on a closed folder's black circle in XTreeMac's file tree opens the folder and turns the circle white. Currently available disk volumes are displayed above the file tree, like a row of file folder tabs.

Making the Choice

Ultimately, XTreeMac's shortcoming may be that it tries to do too many things and fails to excel at any one of them. For sophisticated file-finding features, DiskTop does a better job and uses less memory. For a Finder replacement emphasizing quick application access and launching, PowerStation is a better choice. And there are disk labeling programs that offer much more than XTreeMac. XTreeMac's major asset is its tree-structured way of looking at disk organization, but that alone is not worth spending $100. When XTree irons out the bugs, makes all file-management procedures equally easy, puts some punch in the file-finding function, and figures out what the Deskpad is for, then XTreeMac may be worth the price.

—Robert C. Eckhardt

See Where to Buy or circle 892 on reader service card.

COSMIC OSMO 1.0

Interactive Storybook

Pros: *Humorous; elaborate animation and sound effects.* ***Cons:*** *Provides few hours of entertainment value; doesn't inspire imagination.* ***Company:*** *Activision Entertainment.* ***Requires:*** *Mac Plus; hard disk. 2MB RAM recommended.* ***List price:*** *$69.95.*

It's always painful when you have to criticize a good idea that just didn't work out. When I first saw Cosmic Osmo it looked like a charming and amusingly absurd follow-up on The Manhole—Activision's first interactive storybook. But as it turned out, I was disappointed by Osmo, no matter how hard I tried to like it.

Cosmic Osmo is entirely new and unrelated to The Manhole but shares the same basic structure. Cosmic Osmo, too, is an elaborately constructed fantasy based on HyperCard. All action consists of exploring the Osmo solar system with simple mouse actions, such as steering a boat, opening doors, and dragging pieces of a puzzle together. As you explore the story you uncover little gems of animation and digitized sound. Unlike games that offer a competitive challenge, interactive stories' goal is exploration.

The name of the story comes from its chief character, a little spaceman named Osmo. You climb into Osmo's spaceship and travel to different worlds in the Osmo solar system, including Vegetable Moon, Holy Mackerel, and Osmo's home planet. Osmo makes cameo appearances as you stumble through cartoonish scenes unlocking impish jokes.

Missing the Mystery

Before I really started exploring with Cosmic Osmo, I liked the benignly humorous approach. But it wore thin pretty quickly. The jokes, along with the cartoonish images, gave the story a two-dimensional quality that prevented me from becoming involved with the story. I was never able to lose myself in another world in the same way that I was with The

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Manhole. My imagination wasn't stimulated enough to fill in the gaps.

What's worse, I quickly exhausted the story. Within three hours no stone was left unturned. My seven-year-old son Miles accomplished the same result in less than five hours, virtually losing interest in the game after that (this seems remarkable considering that Miles often reads the same story night after night). Familiarity is not a cause for lack of interest if a story captures a child's imagination. And that is Cosmic Osmo's fatal flaw—it doesn't capture the imagination; the story goes flat after only a few hours.

The creators of Cosmic Osmo and The Manhole have put months of care and effort into these stories to make them as rich as they are in imagery and effects. The difference between the two stories is that The Manhole is pleasurable and intriguing to revisit, while Cosmic Osmo exhausts itself because it never gives the impression that there is much more than meets the eye. Why does The Manhole succeed where Cosmic Osmo fails? It could be that the images in The Manhole have a magical quality that makes the story seem mysterious, while the amusing images in Cosmic Osmo are only silly. Cosmic Osmo also suffers from overdesign. Everything is exactly where you expect it. This is ordinarily a good feature in software, but in an interactive storybook it gives the story a cut-and-dried feel. Although creating a captivating microcosm is obviously no small challenge, I'm convinced that interactive stories remain an innovative and appealing idea.—*Adrian Mello*

See Where to Buy *or circle 735 on reader service card.*

Observing Osmo

You can view planets in the Osmo system through the telescope or on a wall map. In this scene you can check out a fish-shaped planet called Holy Mackerel.

Educational Geography Games

ATLAS EXPLORER 1.0

Pros: *Easy to use; provides feedback for both student and teacher; detailed coverage of some areas of world.* ***Cons:*** *Not very stimulating.* ***Company:*** *Springboard Software.* ***Requires:*** *Mac Plus; second disk drive; hard disk recommended.* ***List price:*** *$49.95.*

WHERE IN THE USA IS CARMEN SANDIEGO? 1.0

Pros: *Entertaining; challenging.* ***Cons:*** *Key-disk copy protection.* ***Company:*** *Brøderbund.* ***Requires:*** *Mac 512KE; second disk drive.* ***List price:*** *49.95.*

GLOBAL TRESPASS 1.0

Pros: *Inexpensive entertainment; clues encourage player to do research.* ***Cons:*** *Overly complicated; requires more luck than skill.* ***Company:*** *Mysterium Tremendum.* ***Requires:*** *Mac Plus.* ***List price:*** *$19.95.*

Three new educational games, Atlas Explorer, Where in the USA Is Carmen Sandiego?, and Global Trespass, attempt to make learning about geography both fun and exciting.

Atlas Explorer, from Springboard Software, is basically a tutorial and a drill-and-practice program built around simple outline maps. It works in three different modes. In Explorer mode you move around the world by highlighting different areas and focusing on various regions; by moving from map to map you can select an area of study, or hone your map-identification skills. When you are in Tutorial mode, a scrollable window appears at the bottom of each map screen with data about the highlighted area (see "Tutorial Mode"). You can test your knowledge about a region or country in Quiz mode. A Record-Keeping feature keeps track of which maps you have mastered and where you need more practice; it can also be used by a teacher to chart a class's progress.

Unfortunately, there is nothing about Atlas Explorer to stimulate the student who isn't already curious about geography. The maps are excruciatingly plain, and there are no goals except to score points by responding quickly and correctly to multiple-choice questions and to earn special icons that testify to your ability to identify countries. Atlas Explorer may eventually get students to distinguish between Brazil and Argentina, but it is likely to gather dust on the shelf unless an imaginative teacher can think of an exciting way to integrate it into a geography curriculum.

Where in the USA

In contrast, Brøderbund's Where in the USA Is Carmen Sandiego? is a lively and challenging way to practice map-reading skills. Played exactly like its precursor, Where in the World Is Carmen Sandiego? (*Reviews, Macworld,* November 1988), this game lets you explore the 50 states and the District of Columbia as you collect clues that reveal your suspect's identity and where he or she is headed next. As in the earlier version, you move from city to city by clicking on a map, and you question witnesses by clicking on places in each city, like a library or sports stadium (see "Witnesses").

There are more levels of play than in Where in the World and more suspects, and clues are often more subtle. Elusive clues may discourage younger children from playing on their own, but they make the game more interesting for older children and adults. As with Where in the World, you have ample time to catch the suspect before the clock runs out.

Where in the USA comes with a copy of *Fodor's USA*, a travel guide, for deciphering clues about the suspect's destination, and a clever scrapbook, ostensibly stolen from Carmen Sandiego, that contains information about gang members. Accompanying documentation gives hints about how to use the travel guide and other reference works to solve the mystery. Once again Broderbund has produced a learning tool that is not only educational but also loads of fun and not the least bit stodgy.

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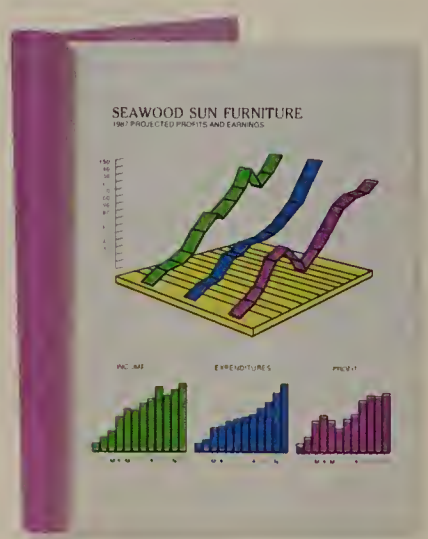


Drawn in SuperPaint 1.0

When the bank wanted profit estimates, we walked in with these and walked out with the loan. Once again, *SuperPaint* and Silicon Beach provided the solution.

The next stage of growth required a more professional image. *SuperPaint 2.0* gave us the features we needed to create our new look.

SEAWOOD
SUN FURNITURE

SuperPaint 2.0

For our first newspaper ad, we wanted something clean and simple. But every photo at our disposal had different lighting and backgrounds — it was tough to combine them in one ad. That's when we discovered that Silicon Beach had again provided the solution. *Digital Darkroom*'s basic image enhancement capabilities and sophisticated tools automated the process for us.

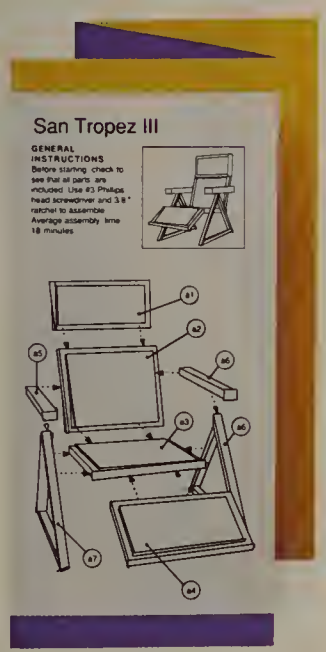
Digital Darkroom

For our mail-order catalog, we sat down with *Digital Darkroom* again, but this time we let our imaginations run wild and created this composite image. *Digital Darkroom* made short work of the seemingly impossible task of getting the dog and cat to sit still for a photograph.

Digital Darkroom
SuperPaint 2.0

Provides Solutions. And Again.

When we started to produce our own instruction sheets, we quickly discovered *Super 3D*. This 3-D modeling and animation software from Silicon Beach made it easy to build vivid 3-D models and then "explode" the pieces. Then we exported the image into our tried-and-true *SuperPaint* to add arrows, dashed lines and text.



Super 3D 2.0
SuperPaint 2.0

Display and output: Super 3D 2.0

Here we are designing the first piece of our very own line of furniture. *Super 3D* was a perfect visualization tool for the ideas bouncing around in our heads.

From a simple logo to an inspiration for a whole new aspect of our business — that's how Silicon Beach Software provides solutions. Again. And again. And again.

Okay, okay... Kyle and Judy and Seawood Sun Furniture aren't real. But any resemblance to real Macintosh customers is purely intentional. We made them up by abstracting from the stories of our own customers to present you a scenario you could identify with.

Silicon Beach offers you the same benefits we offered Seawood... Software so easy to use that you can pick it up and produce quality work on day one. Yet software so powerful it continues to surprise and amaze you as your sophistication grows. A family of products with a consistent approach to user interface and documentation. And a company that will continue to provide solutions for your growing needs with innovative new products, powerful new versions, and some of the best technical support in the industry.

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Super 3D™ 2.0
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System Requirements: Macintosh Plus, SE or Macintosh II. For color viewing, a color monitor is required. For Super 3D color, 68881 math coprocessor required. Hard-disk drive recommended.

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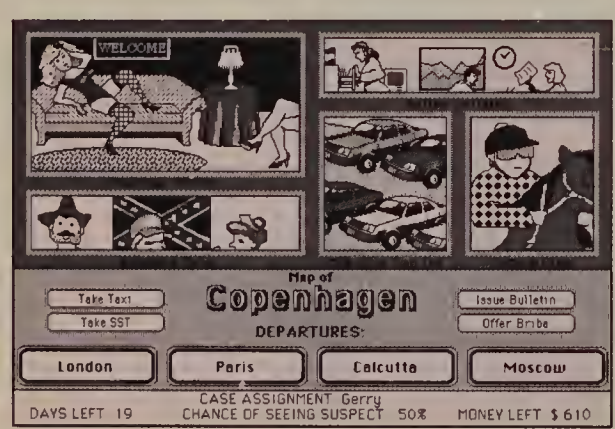
Circle 266 on reader service card

Tutorial Mode

In the Tutorial mode Atlas Explorer displays a window that contains basic facts about the entire region on the map or about a selected country. Scrolling down on the window for the Netherlands would reveal the names of major cities and their populations.

Witnesses

In Where in the USA is Carmen Sandiego?, some witnesses only provide a clue to the suspect's next destination, but others also offer a hint that will help the player make an ID.



Locales

In each city that you go to in Global Trespass, you can question witnesses at places the culprit may have visited. The places that suspects frequent are supposed to help you determine suspects' physical descriptions.

Shades of Carmen

The popularity of Carmen Sandiego has apparently inspired Mysterium Tremendum's Global Trespass, an adult game in the same tradition. Unfortunately, the game is so complicated that it can be punishingly frustrating.

Players fly from city to city searching for clues to a suspect's physical description, gang affiliation, and next destination. Clues are found by clicking on different locales in each city and questioning innocent bystanders (see "Locales"). The hints indicating where a culprit is headed next may require you to consult an almanac, an atlas, or someone with a very good memory. (Where did Al Pacino want to go in the film *Dog Day Afternoon?*) Determining the suspect's description, however, is extremely confusing. Witnesses, for instance, either always tell the truth or always lie, but often they are not sure about what they saw and sometimes they use double negatives.

Although Global Trespass is not in the same league with Carmen Sandiego, it can provide some inexpensive entertainment for people who aren't interested in arcade-type games and who want more challenge than Carmen and her gang can offer.—*Gerry Lukos*

See Where to Buy or circle 712 (Atlas Explorer) on reader service card.

TABLETOOLS 1.01

Table Production Program

Pros: *Excellent cell handling (sizing, grouping, alignment, and fills); spreadsheet-style numeric formatting; From Within Shuttle links graphics and spreadsheet programs; extensive style sheets (including cell styles).* ***Cons:*** *Difficult interface for advanced features; no usable graphics scaling; little typographic control; no EPS save feature; huge (800K, 950K under MultiFinder) and somewhat volatile.* ***Company:*** *Mansfield Systems.* ***Requires:*** *Mac Plus.* ***List price:*** *$395.*

Tables, along with equations, have always been the traditional typesetter's nemesis and bailiwick. They're full of minute details and just plain tough to get right. Mac programs let you create basic tables but fall short with complex ones—especially those with running text. TableTools is designed for creating complex tables, and it does a very creditable job.

Microsoft Word 4.0's new table features, however, address many of the same problems. Both programs lack some key table-production features, but TableTools in particular overcomes many of the big impediments.

First and foremost, both programs allow for text wrap within tabular columns. Second, you have control over the size of table cells and their associated lines and (with TableTools) fills. Neither program, however, gives you good control over line thickness, color, and style. Neither lets you set type vertically or diagonally. And neither offers much typographic control—over letterspacing, word spacing, hyphenation, or justification. Bad typography really glares in narrow columns, so this control is important with tables.

General Approaches

Tables in Word are distinct objects, like graphics, different from normal text matter set up with tab stops. Word's Insert Table command creates a basic table with the number of rows and columns you specify; you can add or delete rows and columns later.

TableTools acts like a more powerful version of Word's table mode, with features reminiscent of Excel and PageMaker. TableTools' cell handling and type formatting are similar to Word's. The From Within Shuttle, which works much like Word's QuickSwitch feature, lets you include and update material from other programs. TableTools has number formatting like Excel; and its zooming, pasteboard rulers, and drag-'em-out ruler guides are much like PageMaker's.

TableTools is more robust, though less accessible, than Word's table mode. There are Beginner, Intermediate, and Advanced modes, which provide power *or* ease of use, but not both. Like Word, TableTools has text styles, but it also has styles for tables, column widths, row heights, and—especially useful—cell formatting (specifying object alignment, fill percentage, style for contained text, and so forth).

TableTools lets you group two or more cells together as a single cell containing one object—a text block, number, or graphic. You can align the object at the

(continues)

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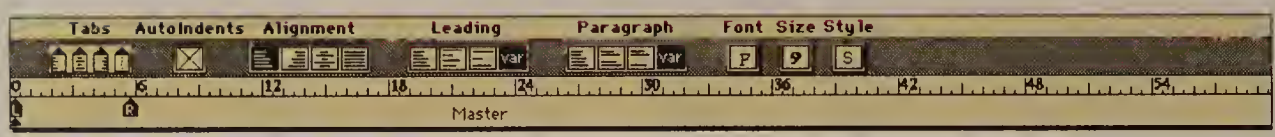


Text Ruler

TableTools gets almost every aspect of text formatting onto a single ruler. Settings can apply to any group of lines—not just to a paragraph. You can also have multiple ruler extents in a paragraph.

top, middle, bottom, left, center, or right of the cell (independent of text alignment within a text block).

You can put a diagonal line (NW to SE) in a TableTools cell; you can specify a hairline, 1-point, 3-point, or 5-point dashed or solid rule for any of the four cell borders and/or the diagonal line; and you can fill a cell with grays from 10 to 100 percent. (Here's a tip: use the Shadow type style to put white type on dark backgrounds.) You can also give numeric cells a variety of formats: dollars-and-cents, exponential, date.

Word has three major cell-handling limitations: You can't specify a fill for cells without PostScript commands, you can't automatically align objects at the center or bottom of a cell, and you can't group a cell with the cell above or below it. You can merge cells next to each other, however.

Word does let you expand the width of any cell arbitrarily, not necessarily matching the width of the cells above and below it (it must match in TableTools). Word's normal border tools allow you to put lines around cells, but not hairlines; and again, there's no Fill command.

Type Handling

Word's formatting controls provide basic control over type, including rudimentary letterspacing. Paragraph controls within cells work just as they do within column margins; you can set left and right indents for each paragraph, first-line indents, tabs, leading, and so on. Using decimal tabs, you can align columns of figures followed by parentheses or footnotes.

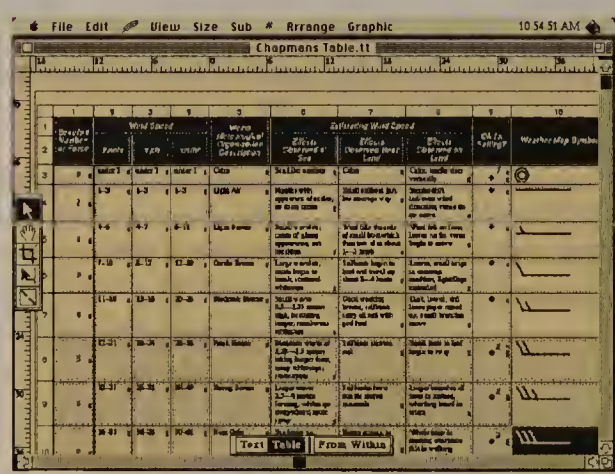
TableTools (excluding its letterspacing and dot leaders for tabs) offers type control almost identical to Word's, but with a couple of convenient extras. TableTools' Autoindent feature lets you set the left and first-line indent, and the program adjusts the right indent to match.

The interface is the greatest problem with TableTools' type handling. You have to drag on the ruler to adjust indents and tabs, for instance; there's no dialog box for typing in the specs. Paragraph and character formats can both be set from the ruler, which gives rise to TableTools' unwieldy and confusing use of *ruler extents*—groups of one or more complete lines to which ruler formatting applies. You can have multiple ruler extents in a paragraph, and anything overriding the format within a ruler extent (such as a word in italics) is called a local exception.

TableTools' style sheets offer about the same text-formatting powers as Word's, but mastering the interface is frustrating, even for a style-sheet veteran. You can create styles by example in TableTools, but its hierarchical style sheets with multiple types of styles are difficult to set up. You can specify a text style within a cell style, so you can format the cell and the contained text all at once, but you must plan things in advance to take advantage of it. You can't select text across multiple cells for formatting, so if you don't start out with cell styles that contain text styles, applying text formatting becomes a repetitive, select-then-apply process.

Importing Graphics and Spreadsheets

Both programs support the major graphics formats—PICT (objects and bitmaps, including color), TIFF (including color and gray scale), EPS, and MacPaint—but Word wins this one hands down. Word lets you include as many graphics as you want, but TableTools allows only a single graphic per cell, and TableTools' cells don't expand to contain graphics, as do Word's. You can use TableTools' hand tool to position an oversize graphic within a cell; you can then click on the cell with a cropping tool to permanently eliminate areas outside the cell boundaries.



On the Table

TableTools lets you create very complex tables, including grouped cells, filled cells, graphics within cells, reverse type, and variable line sizes.

Original Size and Cell Size are your only choices for scaling graphics in TableTools, and scaling to cell size is virtually useless; TableTools ignores aspect ratio and stretches graphics to fit nonproportionally. You can't specify a scaling percentage or scale by dragging, so you have to scale images in the source program before pasting them into the table. With Word you can crop and scale by dragging, and you can scale proportionally.

Both programs let you switch into a source graphics program to edit a graphic and jump back to the table with the new graphic pasted in. TableTools' From Within Shuttle works with MacDraw I and II, Illustrator (1.1 and 88), MacPaint, FullPaint, Cricket Graph, and Excel (1.5 and 2.0), whereas Word's QuickSwitch only works with SuperPaint (1.1 and 2.0) and Excel (1.5 and 2.0).

Both Word and TableTools let you import spreadsheets, although with Word you simply paste them in. Both let you switch into Excel to modify the data, then come back into the updated table. TableTools provides a Lock Cells Against Spreadsheet feature, so if a cell contains something that Excel can't handle, you can lock the cell and Excel ignores it. For QuickSwitch purposes, Word limits you to what Excel can handle (no multiple-paragraph cells, for instance, or font changes within a cell).

You can convert tables from either program into PICT format, though you face all the problems that accompany PICT transfers. Expect problems with fractional character widths, pasted PICT and EPS graphics, and line widths. TableTools is somewhat better than Word in this regard, and the TableTools manual has an

(continues)

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appendix showing examples of moving tables into a variety of programs—very useful in avoiding PICT pitfalls. A Save As EPS option would be an even better solution.

Cards on the Table

TableTools still has the hallmarks of a young program—an ungainly adolescent, to be precise. It's huge, at almost 800K, and it sometimes quits without saving when you exceed available memory (though it usually manages to warn you before doing so). Save often. The program wants 950K under MultiFinder, but you need more with complex tables. TableTools also has problems dealing with nonstandard Open dialog boxes created with INITs (it crashes).

Mansfield Systems says that version 1.1 will include a spelling checker DA; will allow 1-degree incremental rotation of objects within cells; and will offer custom line widths (but still no white lines), tab leaders within cells, an accents feature for placing one character directly on top of another, alignment of dollar signs in columns of figures, alignment of figures followed by footnotes, and foreign currency number formats.

TableTools offers several reasons to go beyond Word's table mode—cell fills, cell styles, noncontiguous cell selection, locking cells against an Excel spreadsheet, top-and-bottom cell grouping, vertical alignment, hairlines, numeric formatting, zooming, pasteboard rulers, and ruler guides. You have to overcome TableTools' obtuse interface to get to the program's advanced features, though, and you must deal with the lack of usable graphics scaling. You'll probably want more typographic savvy (though you won't find it in Word, either), or the general features of a good word processor. You might also be frustrated by the uncertainty of PICT transfers.

If you produce complex tables more than a few times a year, though, and if TableTools' failings won't prevent you from producing the tables you need, TableTools can save you a lot of time and let you do things you can't do with Word alone.—*Steve Roth*

See Where to Buy *or circle 880 on reader service card.*

4TH & INCHES 1.0

Arcade-Style Sports Game

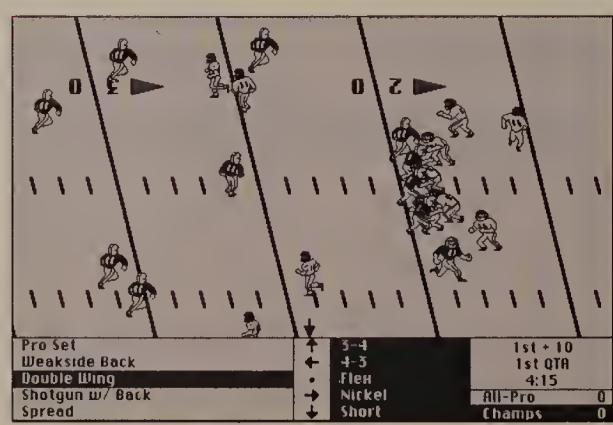
Pros: *Easy to learn; smooth graphics; two-player capability.* ***Cons:*** *Lacks variable skill levels; defense too blond; offense too easy.* ***Company:*** *Accolade.* ***Requires:*** *Mac 512KE (does not run on Mac II, IIcx, or SE/30).* ***List price:*** *$44.95.*

Several strategic football simulations have been introduced for the Mac, but no arcade-style football games. 4th & Inches, from the creators of the highly addictive Hardball, fills this void. Unfortunately, despite the fact that both games were designed by Bob Whitehead, 4th & Inches doesn't live up to the legacy.

Runnin' and Gunnin'

On offense, you're given a choice of 5 formations from a group of 11, based on the down and yardage situation (see "Scramblin' Man"). After choosing a formation, you're presented with 5 plays from a total of 23 runs, passes, and kicks. The choice of plays is based on the down, yardage, and formation selected. After you have called your formation and play, you can choose any one of five players to whom the play can be directed.

Once you've selected the play, you take control of the quarterback. If you've called a run, the QB hands off the ball automatically, and control switches to the player receiving the ball. If you've called a pass, you control the QB until you throw the ball, at which time control switches to the receiver—if he catches it.



Scramblin' Man

The QB has taken the snap and is rolling right. The down, yardage, score, and time remaining are shown in the box at the bottom right. The defensive and offensive play selection boxes are on the left.

Playing offense is the most enjoyable part of the game. Not only does it offer the widest choice of plays and formations, but you really feel in control. On defense, things just seem to happen.

I did run into some problems playing offense, however. First off, it's too easy. I quickly progressed to the point where I could connect with a 30- to 50-yard bomb about three times out of five. The offense is also unbalanced; it's much easier to play the pass than the run.

Another problem with the passing game is that once you select a receiver, you are locked into throwing to him, regardless of how the play breaks. It's not uncommon to see two or three receivers downfield while your man is covered. Your only option is to scramble, but this seldom results in gains of more than a yard.

There are five defensive formations. You choose one, then have the option of *blitzing* with a defensive back or *dogging* with a linebacker.

Although the various plays and formations are supposed to work better against certain plays, I found little difference among them. In fact, I felt that defensive play in the game was weak and bland. QB sacks are nearly impossible, and interceptions are more a matter of luck than skill. The kick defense also has problems; there is no way to block the kick.

Post-Game Wrap-Up

Because the on-screen athlete moves in the direction that you last moved the mouse, I found it difficult to control that athlete's movement using the mouse. The keyboard works better, but when two human players go head to head, you need to use the mouse.

4th & Inches gives you a team roster, with two choices for each position, so that you can transform your team's lineup to suit your playing style (your choices are essentially speed or strength). Nevertheless, I still found the game to be generally disappointing; neither the level of strategy nor the arcade action were challenging. And while I improved rapidly, my computer opponent did not. —*Jeffrey Sullivan*

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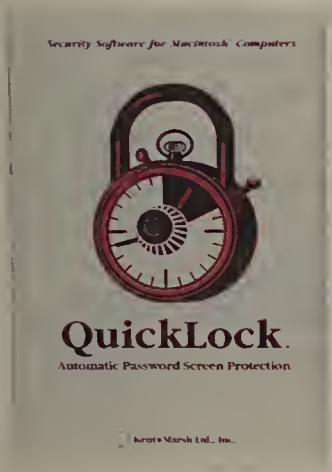

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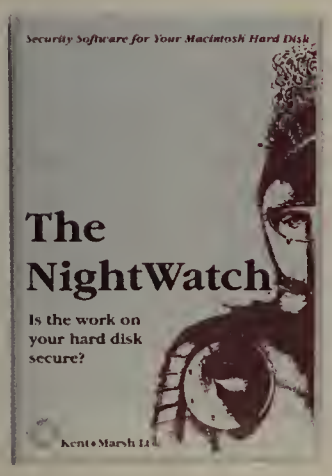

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QUICKMAP

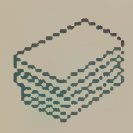
Map Creation Software

Pros: *Simple-to-follow interface.* ***Cons:*** *Maps limited to size of HyperCard screen; inadequate documentation.* ***Company:*** *MicroMaps Software.* ***Requires:*** *Mac Plus.* ***List price:*** *$99.*

ELECTRONIC MAP CABINET

Map Creation Software

Pros: *Comprehensive collection of maps; color display.* ***Cons:*** *Limited searching features; slow redraw; skimpy manual.* ***Company:*** *Highlighted Data.* ***Requires:*** *Mac SE; CD ROM player.* ***List price:*** *$199.95.*



About a year ago John Sculley noted that the next big development in personal computing would be desktop map making. The right software could link statistical or demographic data to areas on a ready-made or custom-made map to create a graphic representation of data distribution. QuickMap and Electronic Map Cabinet attempt to make this vision a reality, but I doubt that they are exactly what Sculley had in mind.

QuickMap, produced by the makers of MacAtlas and HyperAtlas, lets you import maps and numerical data; divide the data into ranges, or classifications; and produce printed maps that use screen patterns to denote the different ranges of data. The HyperCard interface makes QuickMap relatively simple to use, but it also severely limits the size of maps that the application can produce.

Importing, Analyzing, and Mapping

The QuickMap USA stack has a built-in map that you can use to plot data on a state-by-state basis. On the data import screen, you can import two sets of numerical data, such as census counts for different years. The next screen prompts you to load one of these data sets into the stack to perform various types of analysis using a sort of on-screen calculator. You can, for instance, subtract the older census count from the more recent one to create a third set of changes in state populations.

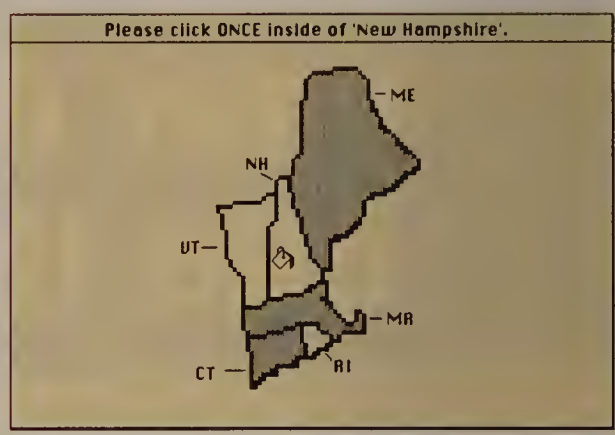
The classification screen lets you specify the ranges into which you want to divide the data. You then select fill patterns to represent each range of data, produce the finished map on screen, and save or print it. If you don't like the results, you can always backtrack to an earlier screen.

The companion stack, Custom QuickMap, lets you make your own QuickMap application with a map of your choosing. The first time through, it prompts you to import a MacPaint-type file and a text file containing the names for each area on your map. You then link the text file to the map by clicking on each area as the program displays the name. Using a map that you create or modify in another program may call for some trial and error, because QuickMap does not provide any means to position the map on the screen.

Easier Said Than Done

Actually, producing any output with QuickMap can take practice. The sparse documentation is not always clear, and it neglects to explain many of the buttons. Moreover, it assumes a familiarity with data mapping that belies the program's simple interface. The brief paragraph that explains the normal distribution option, for instance, offers no advice as to when such a classification should be used. While mapping the distribution of my Macintosh user group's membership, which is heavily weighted toward one state, I tried the normal distribution option and got meaningless negative numbers in the middle of the data range.

Taken one by one, the problems I had using QuickMap are minor, but together they indicate a lack of careful troubleshooting. If you inadvertently click during the creation of a custom map, for instance, the stack is corrupted, and if you decide to use the default patterns after you've already selected a custom pattern, the program appears to hang, although it is actually producing a map behind the current card. Some of QuickMap's potential trouble spots could have been avoided with more thoughtful programming; others could at least be covered in the documentation.



Creating a Custom QuickMap
To create a custom QuickMap you link a text file to areas in a MacPaint-format file by following QuickMap's prompts. Here I am linking New Hampshire to the region indicated by the paint bucket.

Megabytes of Maps

For people who need to import maps into their applications, Highlighted Data's Electronic Map Cabinet is a CD ROM that generates detailed maps of United States cities, states, and regions. The software that accompanies the CD lets you select an area of the country or one of hundreds of cities and produce a map to any of a wide range of scales. You can show just the features you choose, including highways, local streets, waterways, county lines, and park land, and display them in either color or black and white. Maps can be saved in PICT format for export to other programs.

Electronic Map Cabinet is a fascinating product with many potential uses, nevertheless, a lot of rough spots remain to be smoothed out in the next version. An inactive menu item suggests (and conversation with a company representative confirms) that a future version will enable you to search for streets by name. For now, however, once you have a city map on the screen you have to hunt for the street you want by trial and error. The program's biggest shortcoming, however, is its documentation. A mere two pages, it does not do justice to a program of this sophistication. The product, which draws each new map based on data stored on the CD, is by nature slow, and the paucity of instructions almost guarantees that you will make mistakes and have to wait while the program draws maps you don't really want.—*Gerry Lukos*

See Where to Buy or circle 863 (QuickMap) or 743 (Electronic Map Cabinet) on reader service card.

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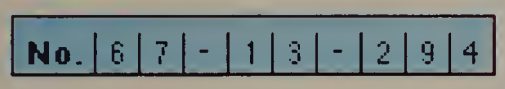

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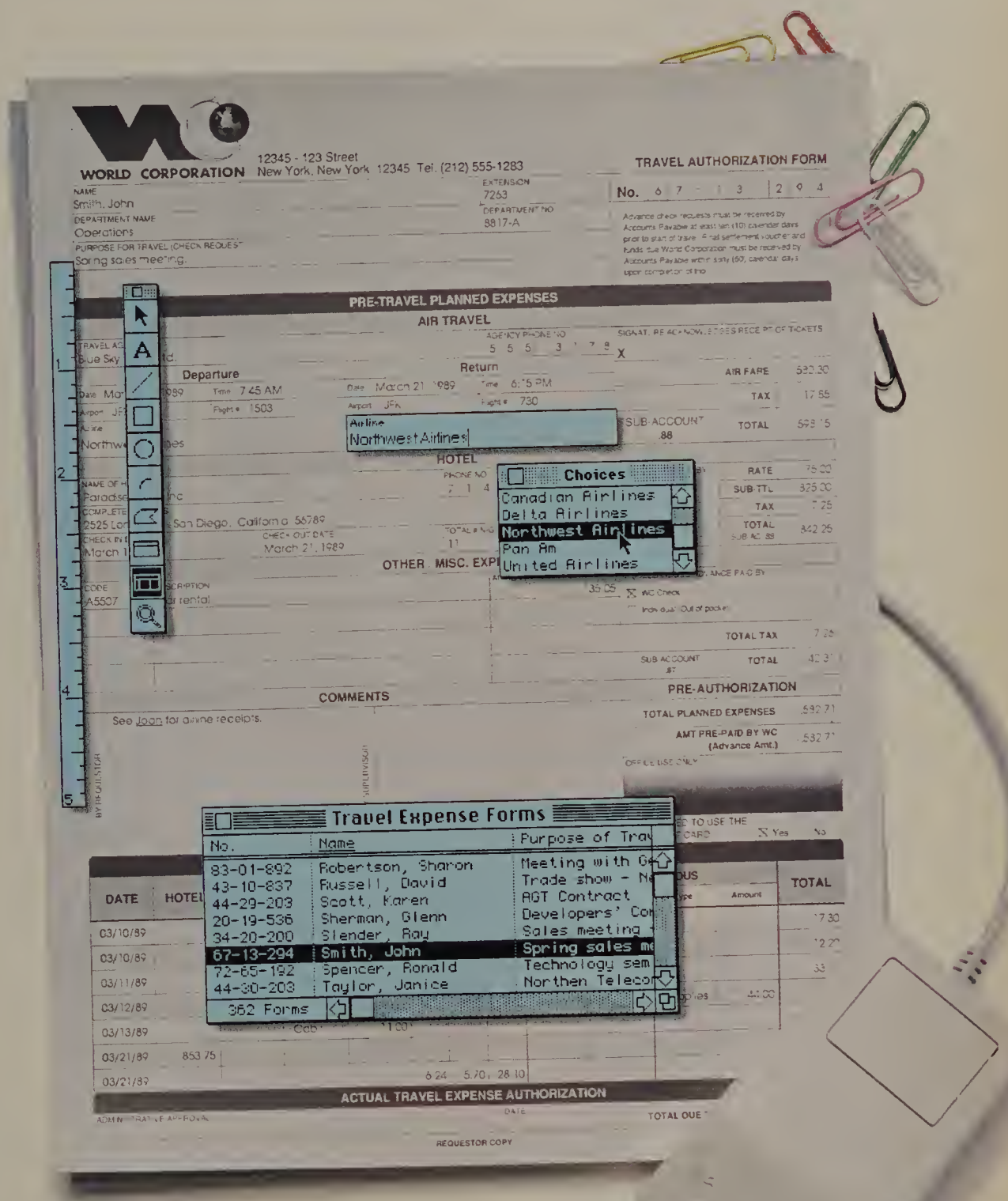

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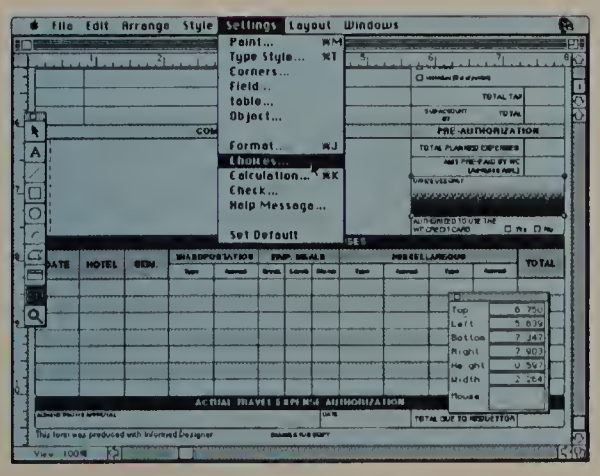

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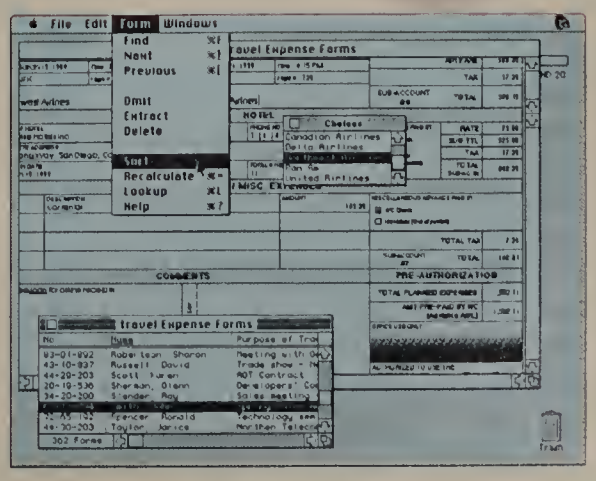

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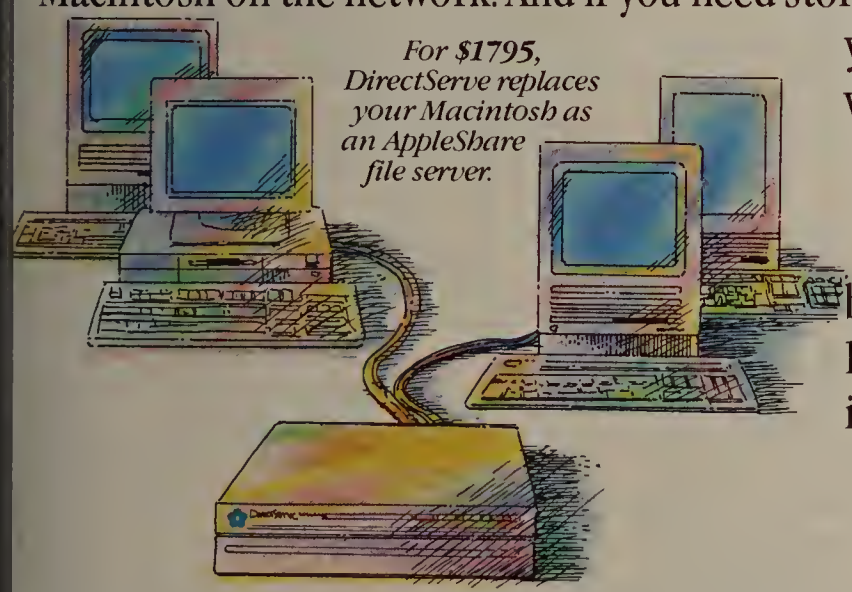

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- Caslon no. 224 book italic
- Caslon no. 224 bold
- Caslon no. 224 bold ital
- Century oldstyle
- Century oldstyle italic
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- IC ComicBook
- IC ComicBook 2
- Commercial Script
- LSC Condensed
- LSC Condensed italic
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- Futura light
- Futura light oblique
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- Futura book oblique
- Futura medium
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- Futura demi bold
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- Futura bold
- Futura bold oblique
- Futura extra bold
- Futura extra bold oblique
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- GLYPHIC series outline
- GLYPHIC series outline italic
- Gill San light
- Gill San light italic
- Gill San
- Gill San italic
- Gill San bold
- Gill San bold italic
- Gill San ultra bold
- IC GRAPHIK
- IC GRAPHIK SHADOW
- Guts
- hairpin
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- Harry thin
- Harry plain
- Harry fat
- IC HEADLINER
- IC Helv light
- IC Helv light italic
- IC Helv regular italic
- IC Helv regular cond.
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- IC Helv black italic
- Honda
- IC IMAGECLUB
- Isbell book
- Isbell book italic
- Isbell bold
- Isbell bold italic
- Italia book
- Italia medium
- Italia bold
- IN…TRIAL
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- Milano Roman
- Panache
- Panache
- Jamille
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- Leawood book
- Leawood book italic
- Leawood bold
- Leawood bold italic
- IC Liberty
- IC Liberty outline
- IC LYNZ
- Mistral
- IC Melio
- IC Melio italic
- IC Melio bold
- IC Murray
- IC Murray bold
- IC ABCDE microgram outline
- IC ABCDE microgram bold outline
- IC MICROGRAM cond. outline
- IC ABCD microgram ext. outline
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- IC Optim
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- P. T. Barnum
- PAPER clip
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- Slimbach book
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- Stone Inf. medium
- Stone Inf. medium italic
- Stone Inf. semi bold
- Stone Inf. semi bold italic
- Stone Inf. bold
- Stone Inf. bold italic
- Stone Sans medium
- Stone Sans medium italic
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- Stone Sans semi bold italic
- Stone Sans bold
- Stone Sans bold italic
- Stone Serif medium
- Stone Serif medium italic
- Stone Serif semi bold
- Stone Serif semi bold italic
- Stone Serif bold
- Stone Serif bold italic
- IC Surf Style
- Serif Gothic® regular
- Serif Gothic® bold
- Serif Gothic® black

- Serif Gothic bold outline
- STENCIL
- L&C Stymie hairline
- T.H. ALPHABET soup
- Tom's Roman
- TOO MUCH opaque
- TOO MUCH clear
- TOO MUCH shadow
- IC Tump Med
- IC Tump Med italic
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- IC Univ 46
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- IC Univ 76
- IC Univ 47
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- IC Univ 58
- IC Univ 67
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- IC Univ 39
- IC Univ 49
- Upright Regular
- Usherwood book
- Usherwood book italic
- Usherwood bold
- Usherwood bold italic
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- Veljovic book italic
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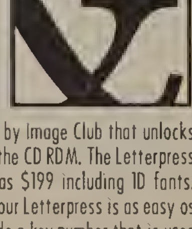

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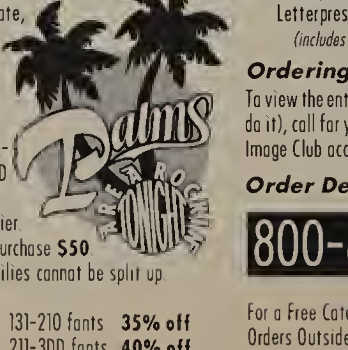

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SIMCITY

City Simulation Game

Pros: *A challenging, dynamic game, realistic and unpredictable; good animation.* ***Cons:*** *Not enough control over some elements of the game.* ***Company:*** *Maxis Software.* ***Requires:*** *Mac 512KE; hard disk recommended.* ***List price:*** *Distributed by Broderbund: SimCity (black-and-white version) $49.95; SimCity (color version) $79.95. Distributed by Maxis: color upgrade $24.95; Terrain Editor $24.95; $34.95 for both.*

After playing Maxis Software's city simulation game, I am humbled by the task of planning and running a city. When I took over Isle de Perche I was an experienced mayor, and I had more power than any real-life city planner or mayor. Yet I created a town with pollution problems and traffic jams, with citizens who complained about taxation, and with reserve funds inadequate to rebuild the city after a tornado demolished the downtown. All I could think about was how much it would cost to bulldoze the ruined areas, restore power, and rebuild. Admit bankruptcy and resign from office? Never. I resorted to embezzling city funds.

Although you may end as an embezzler you can begin with a clean slate—just land, trees, and water. Instead of using one of the prebuilt cities, I chose an island environment in the Terrain Editor. I then customized my Isle de Perche by adding trees, deepening inlets, and opening shipping lanes. Instead of creating the geography, I could have chosen one of the prebuilt cities that come with the program, or I could have let SimCity generate a random 10-by-10-mile terrain with trees, rivers, and water. You can also use the Terrain Editor to modify a prebuilt city or random terrain.

If you choose a prebuilt city, you take over one that has already been developed. Pick your city with care, however, because many come with incipient disasters. As mayor of San Francisco, for example, you may have to save the city and rebuild it after a 1906-size earthquake.

Pave It Over

Whether you begin with fresh terrain or a preexisting city, the first decisions you make usually concern zoning decisions—where to place commercial, industrial, and residential areas. You also locate power plants, fire and police departments, airports, seaports, stadiums, parks, and other amenities. It is important to link each of these zones and facilities with roads, public transportation and bridges.

As you zone areas and build power lines and roadways, the citizens move in and build houses. A simulator turns all of your decisions into animated realities, so that as the city progresses over months and years, it assumes a life and direction of its own. As the community grows, condos, hospitals, and churches appear, factories belch smoke, and office buildings reach skyscraper proportions. The color version of SimCity uses 16 colors to make the game even more enjoyable.

As mayor you must pay attention to all this activity, because as the population grows the city's needs change. For example, a road that once adequately served a residential district now causes traffic jams. A message board alerts you to these and other problems. It also warns you of natural disasters, and notifies you when the citizens want something like more roads or a stadium.

Keeping the Sims Happy

All this development costs. The game periodically displays the budget and requests confirmation on the tax rate and the percentage of the budget allocated for the fire, police, and transportation departments. The different zones generate taxes, but you need to discover the correct combination. Mistakes in the placement of housing developments, industry, or transportation requirements make for a miserable citizenry. When they are mired in pollution, overtaxed, and caught in traffic jams, the people leave. Then you have the problem of a deteriorating urban base. Your condos turn to slums and terrible little bombs appear, representing decay.

SimCity gives you a set of reference maps that let you separately view each of the zones, services, and facilities. For example, you can determine whether the fire department provides adequate coverage for the city; where it doesn't, you need to build another station. You can also check population density, land value, crime rates, power grids, and traffic density. A set of graphs gives you a time line to evaluate the health of the city according to different indicators.

Natural disasters—earthquakes, tornadoes, monsters, flooding, and so forth—make this already complex game even more unpredictable. You can't set the number of disasters, but you can invoke one just to spice up the game, or eliminate them with the No Disasters option.

I heartily recommend SimCity. It is an intricate and intriguing game in which you are continually challenged to take the actions needed to foster a city's growth, respond to the citizens' and city's needs (which are not always identical), balance a budget, and cope with natural disasters. It's involving and a lot of fun.

—*Janet McCandless*

See Where to Buy for contact information.

Isle de Perche
A trolley carries citizens of Isle de Perche past the police department, hospital, churches, and office buildings toward the industrial section of town.

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HARMONY GRID 1.02

Program for Exploring Harmonic Theory

Pros: *Entertaining and educational introduction to musical harmony.* ***Cons:*** *Underlying concepts on which program is based are difficult to understand; key-disk copy protection.* ***Company:*** *Hip Software Corporation.* ***Requires:*** *128K; second disk drive.* ***List price:*** *$99.*

By visually displaying harmonic relationships as you play and listen, Harmony Grid helps you to see the patterns underlying music. This software provides an entertaining way for nonmusicians, music students, and inveterate noodlers alike to experiment with and learn about musical harmonies.

Music by the Numbers

Not surprisingly, the business end of Harmony Grid is an on-screen grid, in which each square holds the letter name and octave number of one pitch (see "The Harmony Grid"). To play Harmony Grid via MIDI or the Mac's internal synthesizer, all you do is move the mouse over the squares. As the pointer passes over a square, one or more notes sound in response, their number and pitch depending on how you've defined the grid.

Typically, you set things up so that only notes in a desired scale will play; you're thereby assured that your improvisations sound harmonious. The current scale's playable pitches are circled on the grid; the other squares remain silent. The notes you trigger are simultaneously highlighted on a graphic representation of a piano keyboard at the bottom of the screen, and you can play on this piano directly if you like. Harmony Grid handles rhythm for you as well, making sure that each new note begins on the beat of an adjustable metronome.

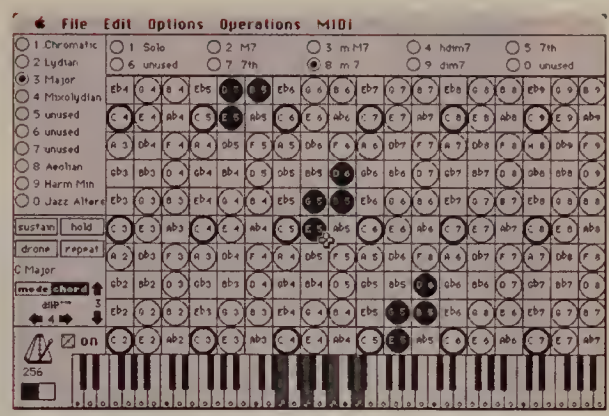
You can't really control Harmony Grid well enough to play planned note sequences with much accuracy: it can be tough to intentionally skip notes that the current scale does allow, and you can't play the same note twice in a row. Instead, the idea behind the program is to let your mouse's meanderings turn up interesting musical patterns serendipitously, and to learn something about harmonic relationships in the process.

You can explore harmonic structures by controlling the properties of the grid: the notes included in a scale, the harmony notes that chime in when you trigger one of the squares, and the structure of the grid itself. The grid's structure is defined in terms of the chromatic intervals that separate adjacent squares. If you set the horizontal grid axis to 1, for instance, and start on the C square of the grid, the row to your right would read chromatically: C, D♭, D, E♭. If you set the vertical axis to 3 chromatic intervals, you would jump a minor third with every square up or down a column. With a range of settings from 1 to 12 in either direction, you can create 132 different grids, each with a unique harmonic geography.

There's nothing conceptually complicated about picking out the notes you want to include in a scale or mode. However, it's a little trickier to figure out how to select the harmony notes (they're referred to as *chords* by the program). When you build a chord, you're instructing Harmony Grid to add a fixed set of intervals every time you trigger a square on the grid, and these intervals will stay the same no matter how you've defined your scale. This would normally result in some very strange chords, since human musicians must follow more complex rules to create standard chord progressions. But the program recognizes when a note called for by these fixed intervals isn't in the scale being used and simply leaves out that pitch. This way, the harmony may get a bit thin, but it's never wrong.

In most situations, you can get around Harmony Grid's tendency to drop notes by defining chords that include pairs of intervals a half-step apart: one member of the pair will almost always play. Or you can consider this characteristic a feature, and put it to good use. By playing an augmented triad on a major scale, for example, you can get two-part simulated counterpoint, with the harmony voice sometimes moving in contrary motion to the lead.

While you're playing, you can switch



The Harmony Grid
Most of the Harmony Grid screen is devoted to the grid, on which the user plays melodies and triggers harmonies. The darkly circled notes represent the root of the selected scale, in this case, C major.

from mode to mode and chord to chord instantly. A set of ten modes and ten chords, along with a grid configuration, constitute an *instrument* in Harmony Grid's lexicon, which can be saved as a file and reopened whenever the musical mood strikes.

The Lost Chord

Although you play only one square on the grid at a time the program highlights the names of every triggered pitch, including the harmonies, every time each pitch appears in the grid. On a piano keyboard, the physical arrangement of notes in say, a minor seventh chord, is different for each key. In contrast, an Em7 in Harmony Grid has the same characteristic shape on the Harmony Grid as a Cm7. What's more, once you're familiar with the shapes of the basic chord types, you can pick out component chords within more complex ones—a quick glance will convince you that a minor seventh chord includes both major and minor triads. Similarly, scales have characteristic shapes that are easy to pick out by tracing the circled squares.

If you have a MIDI keyboard, you can use it instead of the mouse to trigger the Harmony Grid. In this case, each triggered pitch lights up the appropriate square on every octave, which means the chord shapes you see aren't affected by your keyboard voicings and inversions. By checking your voicings against the resulting chord shapes, you should be able to easily figure out the harmonic essence underlying most any cluster of notes.

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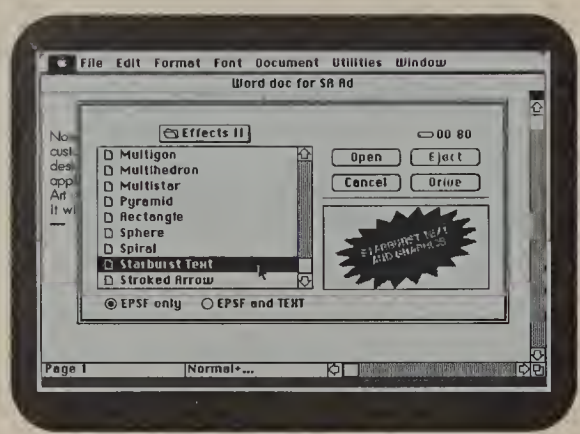

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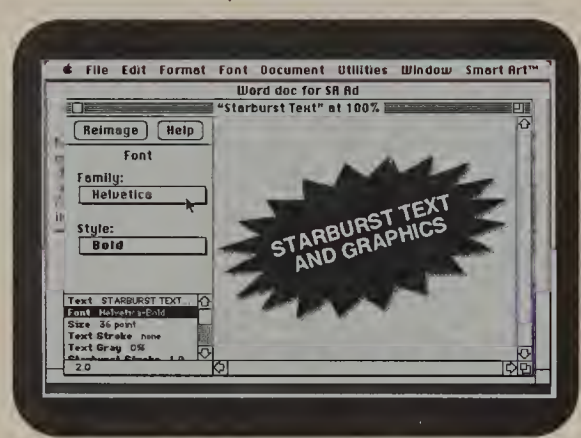

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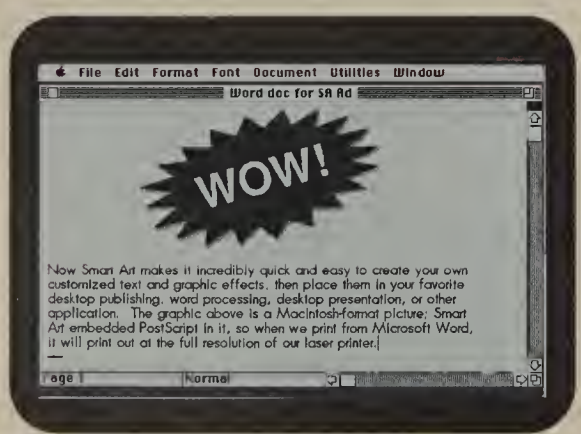

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Dealers Circle 212 on Reader Service Card
End Users Circle 18 on Reader Service Card

Practicing with Harmony Grid won't directly improve your skills on a particular instrument, but the program does offer an engaging, entertaining way to gain an understanding of harmony that will serve you well no matter what instrument you study.—*Steve Cummings*

See Where to Buy or circle 786 on reader service card.

HIDDEN AGENDA 1.0

Geopolitical Simulation Game

Pros: *Good perspective on what it might be like to run a strife-ridden South American country; excellent graphics.* ***Cons:*** *Some encounters leave no option other than to agree; you cannot make proposals of your own; some proposals are made over and over again, even after you've accepted them.* ***Company:*** *Springboard Software.* ***Requires:*** *Mac 512KE; second disk drive. Hard disk recommended.* ***List price:*** *$59.95.*

Following the coup that led to the overthrow of the corrupt dictator Farsante, the dominant members of the Junta have appointed you as Chimerica's new Presidente. And it's your task to try to lead the country into an era of normalcy—prosperity is out of the question. In Hidden Agenda you must juggle many agendas (most of them hidden) as you grapple with the daunting problems facing your country.

Disease and poverty are widespread in the tiny South American country. Most of the land and wealth is held by less than 5 percent of the people. Government corruption remains an issue, as well as the question of what to do with the murderous members of Farsante's Guardia (which eventually became his personal army and death squad).

During the three years you have to rule Chimerica—if you aren't voted out of office or removed in another coup—you can enact any proposal that is brought before you by the members of your cabinet or influential people from Chimerica and abroad. In addition to taking charge of internal affairs, you are also responsible for international relations. You must decide which countries to accept military and financial aid from—and determine how much interference in Chimerican policies the aid entitles them to.

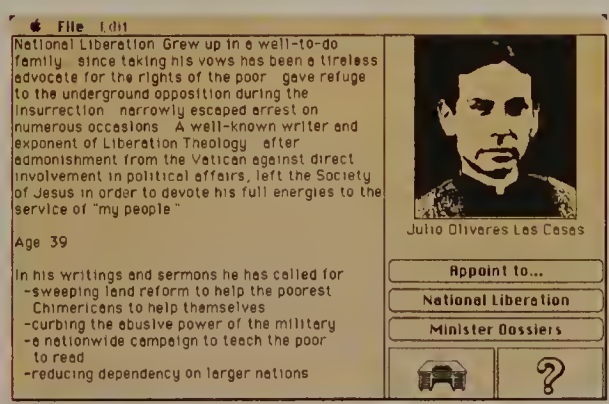
Read All about It

Hidden Agenda's documentation may seem a bit overwhelming at first glance. The User and Reference manuals together contain over 130 pages. However, reading just the four-page Quick Start section provides enough information to start the game. If you want more detail, it's not a bad idea to read the User Manual from cover to cover. The Reference Manual gives a historical perspective to Chimerica's current situation. Springboard also includes a nice color map of the country, although it's not necessary to game play. Online help is available if you need it.

Picking a Cabinet

The game begins with a brief press conference during which you must select three priorities for your term as Presidente from among the nine choices offered. Your next task is to appoint the Ministers of Agriculture, Internal Affairs, External Affairs, and Defense.

The Junta comprises three radically different political parties, each with its own priorities and preferred way of handling situations. In choosing a cabinet, you can read a brief biographical sketch of each candidate, as well as a party dossier that explains more about each party (see "Selecting Your Cabinet"). The ministers' appointments—like yours—are temporary. If they displease you, or appear to be following their own hidden agendas more faithfully than yours, you can request their resignation.



Selecting Your Cabinet

One of your first tasks as Presidente is to fill the cabinet vacancies with members of the three political parties. Using screens like this one, you can check each candidate's platform and see if his or her agenda agrees with yours.

Playing the Game

Play is controlled from the Presidente's office. On your desk are objects labeled Contacts, Consultations, Encounters, Reports, and Logbook. Clicking on one of these either provides you with information or sets up a meeting between you and a cabinet member or what the program calls an influential (banker, peasant, teacher, United States Ambassador, and so on).

Each meeting you hold results in a proposal that you can accept or reject. If it is unclear how best to proceed, you can ask the opinions of your cabinet members. Proposals raised by influentials can also be placed on the agenda of the appropriate cabinet minister, delaying action temporarily or—if not acted on within the year—tabling the issue indefinitely.

You may refer to two types of reports: news excerpts and progress charts. The latter graphically depict your progress (or lack of it) in the areas of military and social spending, infant mortality, land reform, food and export crops, agricultural earnings, cash reserves and debt, and foreign loans and aid.

History's Verdict

Unless you are assassinated, or ousted from office before the end of your three-year term, Hidden Agenda lets you judge your performance from the perspective of history. The game concludes by displaying several pages from a historical account of your reign.

Doing well requires sharply honed diplomatic skills. You must know when to initiate difficult policies, when to compromise, and when to give in. Diverting funds away from exports and using them for health care and education, for instance, may anger the IMF, and Chimerica may lose its aid. Even meeting with representatives of certain factions (such as the USSR or Cuba) can endanger other relations. In Hidden Agenda, making one group happy usually results in making someone else unhappy; finding a workable balance is the key.—*Steven Schwartz*

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SHOWCASE F/X 1.0

Title Animation and Slide Presentation

Pros: *Quickly creates presentation slides and smoothly animated titles and graphics; works with genlock device for titling videotapes and taping slide shows.* ***Cons:*** *Inconvenient, counterintuitive interface; lacks basic drawing features, such as grouping; inadequate editing tools; poor manual.* ***Company:*** *Aegis Development.* ***Requires:*** *Mac II; 2MB; color or gray-scale monitor; hard disk; System 6.0.2, Finder 6.1.* ***List price:*** *$395.*

Showcase F/X is a program for animating titles and graphics that also provides text-over-graphics effects for enhancing slide shows and videotape presentations. Video titling requires a standard NTSC television-signal compatible video card, genlock for synchronizing a Mac II and video signals, and either a camcorder and a VCR or two VCRs.

The Import Business

Showcase F/X documents have a top layer for text and a bottom layer for creating color backgrounds, patterns, and fills. You can import color PICT files from paint and draw programs or from programs such as Cricket Presents, Microsoft PowerPoint, and Wingz. You can import and animate graphed spreadsheet information, for example, making an arrow descend a column to point out the bottom line.

Scanned and captured digital images can also be directly imported as backgrounds, displayed in 8-bit format but retaining any 24-bit information. Rather than rely on the limited shape and fill tools in Showcase F/X, however, you should use a gray-scale editing program like Digital Darkroom to work with digitized images.

To enter text in the foreground, you select the font, size, style, effect, and shadow options from the fonts in the System Folder or Showcase F/X's seven Polyfonts. The fonts can easily be restyled, distorted, mirrored, and resized (although you cannot adjust kerning). Your choices are limited, though: some style options work only with certain fonts, and some look almost identical in the smaller sizes.

To animate text, you select the Script Editor and begin by typing in the total number of frames you want to have. You can enter text one frame at a time or use the Key Frames option, in which Showcase F/X automatically completes the animation between any two Key Frames (*tweening*). To create an animation with the word *ZAP!*, I started with 9-point text in my first Key Frame, selected a second Key Frame, and changed to 128-point text 50 frames later. I then stretched the Polyfont letters out even more by their handles. The result was a 12K script that I used to create a 3.5MB Aegis-format Anim file (see "ZAP! Animation"). To locate a particular frame in Showcase F/X, you flip through a stack of transparencies, unlike VideoWorks where you must look at the frames displayed in separate rows.

ZAP! Animation
Using the largest point size of the animation's frames, it took 66 minutes for Showcase F/X to process my 12K ZAP! script into a 3.5MB animation.

The background and text colors in each Showcase F/X document can be customized with the Mac II's Color Picker, and you can blend colors when assigning pen colors in the color palette editor. Palettes can be saved for use in other Showcase F/X documents. Any Macintosh font or laser font can be converted to a color font, then formatted with any of Showcase F/X's styles. The program does not have a paintbrush, paintbucket, eraser, or magnifying capability, and the spray can has only one size nozzle.

Unfortunately, editing with Showcase F/X is slow. To see a frame as it will actually appear, you must use the Preview command and wait from two to three minutes for something as complex as ZAP! to be displayed. You cannot edit frames separately, and there is no revert and (for most functions) no undo.

Good Compressions

Showcase F/X's best feature is Anim. Anim files consist of compressed images that you can decompress and play back at various speeds. The program compresses Anim files by a factor of 40 to 50, enabling you to store a 10MB Anim file in 400K to 500K. Showcase F/X is most impressive when playing back a 256-color Anim file at 60 frames per second. There are seven preset playback speeds (ASAP, and 60, 30, 15, 10, 5, and 1 frame per second).

Included with Showcase F/X, Aegis Player plays the Anim files, and Aegis SlideShow lets you integrate slides and animations with timed wipes and fades, and select which slide or animation to preload into RAM. With its demanding neon style, my animation's 122 frames (2 seconds running time) required 1 hour and 6 minutes of processing time. Aegis recommends a minimum system configuration of 2MB to run Showcase F/X; I recommend a minimum of 5MB to 8MB.

The Showcase F/X tutorial contains no illustrations of on-screen results. It takes almost 10 minutes for a Mac II to process the tutorial's 50 frames of animation, a valuable lesson in itself. The manual contains numerous typographical and syntactical errors. Menus are shown, but little else about the program is illustrated. Despite the program's being designed for the Mac II family only, Showcase F/X's manual is entirely in black and white—including an 8-page section on color, with repeated illustrations of solid black palettes and color wheels; and the brief section on pen colors is inadequate. Also included with the program is a 15-minute VHS video demonstration tape.

Showcase F/X simply misses with its interface. Even with a text object selected, for example, the program doesn't display the font, style, or pen colors. Making identical changes to multiple objects in the same frame is repetitious because you can't group objects. Despite its drawbacks, however, you can learn to work with Showcase F/X to create the simplest

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titles and slides easily. With careful RAM management, and two or three good drawing and presentation programs, Showcase F/X can help you create excellent-looking slide shows.

Desktop Video Production

Showcase F/X's video-titling capabilities are well beyond the standards of consumer video equipment. I experimented with standard VHS recorders, with a Mass Microsystems ColorSpace II video graphics board in my Mac II, viewing the results on both an Apple color monitor and a standard 19-inch color TV. The titles and graphics lost their Apple-monitor crispness in the dubbed results on a standard screen, and rich saturated colors; but low-saturation colors such as pastels look good on real TV, as does 24-point or larger text. A camcorder produces a better signal than a VCR for animated graphics-over-video effects, and the results are professional looking.

Showcase F/X is a costly proposition for titling home video productions, even if you already have a Mac II (NTSC genlock video boards start at about $1600). But it could be a cost-saving enhancement for professionals who frequently shoot camcorder video and who lack the time or money for studio titling and slide production.—*Keith McCandless*

See Where to Buy or circle 872 on reader service card.

BERNOULLI BOX II 44

Bernoulli Removable Media Drive

Pros: *Quiet; infinite storage capacity; dual purpose as online storage and backup device; toll-free phone and 24-hour BBS tech support.* ***Cons:*** *Expensive; sluggish back-up software; needs MultiFinder fixes.*
Company: *Iomega Corporation.*
Requires: *Mac Plus.* ***List price:*** *$2799.*

Now that the Bernoulli Box II 44 with version 3.11 software boasts access times as fast as some popular medium-speed hard disks (32 ms) and a cartridge capacity of over 40 megabytes (double the previous capacity) Iomega is marketing the system as an

MARK JOHANN

The Bernoulli Box II 44

alternative solution to the problem of escalating online storage needs and floppy or tape archiving. The 80MB online storage of the dual drive unit and the infinite storage capacity of the Bernoulli removable flexible 5¼-inch disk make the Bernoulli system a viable alternative to those 100MB-plus hard disk and tape drive configurations.

Set-up

I tested the Bernoulli Box II 44 on a Mac II with 2MB of memory and System 6.0.2. My first problem was where to put the box. Although it would fit under a IIcx or an SE, the Bernoulli is too narrow to go under the II's CPU; you can put the Bernoulli on top of the CPU and thereby raise the screen by 3 inches. Otherwise, you'll have to allocate an extra 14 inches next to the Mac II.

Although the Quick Setup Instructions are clearly written, setting the SCSI ID is a little like performing microsurgery. You need an ⅛-inch flat-blade screwdriver and a magnifying glass. Mysteriously, there are ten positions on the SCSI ID dial, even though there are only eight possible SCSI devices; it turns out that 0 through 7 are the normal SCSI assignments, and on this Bernoulli position 8 equals SCSI address 0, and position 9 equals SCSI address 1. Termination is relatively straightforward, but it too requires using tools.

Iomega provides an INIT that lets the Mac recognize a Bernoulli cartridge. After copying this INIT to the System Folder and restarting, the Bernoulli's slots appear and act like additional external drives attached to the Mac. Even though it is considerably slower to start-up than an internal hard disk, you can set the Bernoulli to be the start-up device, which would be handy if you regularly use different system configurations (such as switching between Finder and MultiFinder, or using different start-up application combinations).

Workshop and Megacopy, Versions 3.11

Since the Bernoulli cartridge looks just like a big floppy disk to the Finder, you can format a new one either from the desktop or from within the Workshop utility software. Workshop also offers a Short Format option (it just rewrites the directory header of a previously formatted cartridge in seconds instead of taking 13 minutes to completely reformat it), tests both drives and cartridges, gives you information on the life expectancy of cartridges, and sets cache preferences. But it doesn't offer hard disk maintenance or recovery capabilities.

MegaCopy is back-up software that can be opened either as a separate application or from within Workshop. Copying from cartridge to cartridge is relatively fast because MegaCopy performs a mirror-sector copy rather than the Finder's file-by-file copy. The main drawback of this copying technique is that there is no verification, as there is in the Finder. Using MegaCopy for hard-disk-to-Bernoulli backups, however, is relatively slow (a 17-minute backup with MegaCopy took 10 minutes with DiskFit 1.5). MegaCopy also offers fewer features than more developed backup utilities like DiskFit and Redux, or dedicated tape backup utilities, such as global preferences for backup options, file lock-out to allow writing to the source during backup, and scheduling software for unattended backups. How-

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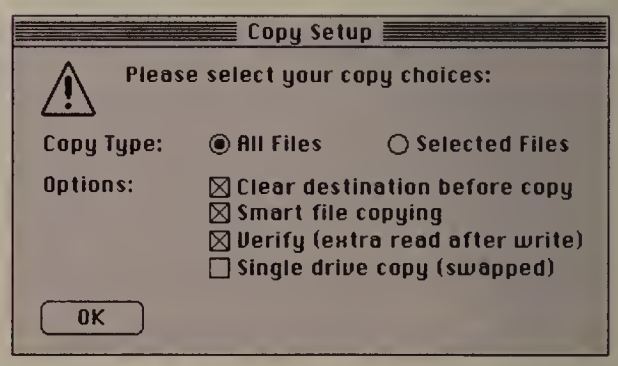

Smart File Copy

The MegaCopy backup program's Smart File Copy lets you automatically format destination cartridges, update only files that have changed since your last session, and add extra protection by verifying changes.

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Circle 126 on reader service card

ever, the Bernoulli's transfer rate of 1MB to 2MB per minute (depending on your choice of software and use of MultiFinder) places it well within the competition's tape drive performance and capacity as a back-up medium (see "Smart File Copy").

Even though Workshop and MegaCopy ostensibly support MultiFinder, there are still such serious bugs that I would suggest limiting yourself to the Finder. The Bernoulli Box's performance under MultiFinder is almost half that under the Finder, whether or not the cache or verification is on. Worse, selecting MegaCopy from a Workshop menu while under MultiFinder results in an error message. And if you try to write anything to a given file while you're backing up that file, the backup announces a fatal error and screeches to a halt, rather than locking the altered file out of the current backup set, as other products do.

Almost consistently under MultiFinder, cartridges formatted using Workshop's Short Format option appear to the Bernoulli as still full, and you are asked whether or not you want to overwrite the current data (although the Finder correctly recognizes these to be "empty"). Occasionally, unformatted cartridges are not recognized at all, and therefore can't be written to, read, or ejected using the normal software tools. Instead, add to your trusty Mac toolbox of jumbo paper clips that same screwdriver you needed to set the SCSI ID, and a pencil with a new eraser. In order to eject a lost cartridge, you must pry off a panel, peek inside the box (you might also need a flashlight), rotate the disk with the eraser until two dots on the drive line up with one another as if you were setting the timing on your car, and then eject it with the clip.

Like the Syquest-based removable hard disks, the Bernoulli Box's chief selling point is its infinite storage capacity (see "Why Say No to Backup," *Macworld,* November 1988). While the initial cost seems a bit pricey at $35 per megabyte (retail price of the hardware storage capacity), by the time you've stored your first 160MB, you've already matched the average per-megabyte price, $16 to $19 per megabyte, for 40MB to 80MB standalone hard disks. If your needs climb to 400MB or more, you'll reduce your cost to about $2.25 per megabyte. Still, several competing Syquest-based removable storage systems offer the same storage dimensions and faster access times at equivalent prices.—*Nancy Canning*

See Where to Buy or circle 723 on reader service card.

THE ANCIENT ART OF WAR AT SEA 1.0

War Strategy Game

Pros: *Three levels of play; combines strategic planning and arcadelike play; game generator; excellent manual.* ***Cons:*** *Specific information from manual required to start up.* ***Company:*** *Brøderbund Software.* ***Requires:*** *Mac 512K (does not run on Mac II).* ***List price:*** *$44.95.*

Brøderbund's The Ancient Art of War at Sea is the seafaring sequel to the classic strategy game The Ancient Art of War. The action encompasses commanding an entire fleet, directing individual ships in battle, and leading hand-to-hand combat on boarding raids. Eleven prearranged campaigns, based loosely on famous sea battles, are included, as well as a game generator that enables players to design an unlimited number of campaigns on their own.

After you load the game, the program prompts you for information from the manual. This rather benign form of copy protection permits making backups but discourages piracy (no pun intended). Just don't lose the manual.

Getting the Picture
Your strategic planning takes place in the map view of the game. Dark areas indicate rough water, dangerous for frigates, and light areas indicate shallows, dangerous to your ships-of-the-line and flagships. On-land, repair, supply, and crown ports are of vital importance.

You can fine-tune the rules of each campaign, such as whether your crew is crack (experienced) or green (novice). Finally, you choose between six different opponents, each with unique strengths, weaknesses, and strategic styles. The same campaign can turn out differently depending on which commander is in charge of the enemy fleet.

Views to Victory

From a vertical scrolling map showing the entire campaign area, you might develop a strategic plan, sending your squadrons of ships into battle or bringing them into port for supplies and repairs (see "Getting the Picture").

An info box tells you the names and types of ships in a squadron; whether they are at anchor, in port, at full or half sail; and the condition of the individual ships. When opposing squadrons encounter one another, you can zoom in and toggle between a near and far view to command the battle. Finally, when two battling ships come close enough for one crew to board the other's vessel, you can zoom in to direct hand-to-hand combat. To be victorious, you must capture or destroy all of the enemy's flagships, destroy its entire fleet, force a surrender (not likely), or capture its crown port.

The map view includes a number of features. Time controls speed up or slow down the passage of time. A message window alerts you when an enemy has been sighted or when an encounter has begun. A Zoom button lets you zoom into a battle to direct the action. If you need to take a break from the pressure of command, a Pause button will freeze the action.

An Engaging Enemy

Upon zooming into a battle, you can toggle between a long view, showing you the entire battle area, and a close-up for precise maneuvering and combat. In the close view, crisp animation depicts the ships as they tack to and fro (see "Crossing the T"). You try to steer your ships into positions that allow you to fire at enemy

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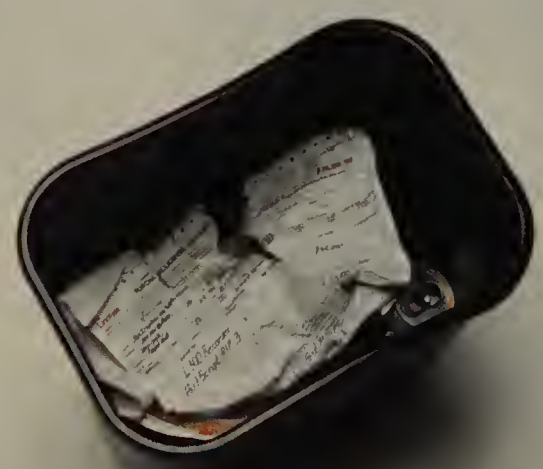

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"I made head-to-head comparisons between Linotype® and Varityper® PostScript imagesetters for the same jobs. What I found, more often than not, was that Linotype produced a 1 point miss or overlap at what looked like uniform intervals on the page. I'm told this banding is a result of their start/stop scheme and that it will only get worse as the equipment gets older. Whatever it is, the results are unacceptable for my work, particularly my color work. On the other hand, Varityper produced flawless, high-quality output at speeds much faster than those other guys. And when I found out that I could get the Varityper for substantially less money, there was no contest . . . I said, buy the Varityper!"

"My advice to anyone looking for a high quality PostScript imagesetter: Do yourself a favor. Consider Varityper and make your own comparisons."

Mr. Ralph Volk, President, Sun Graphics & Publications, Inc., Ypsilanti, Michigan. SG&P, Inc. includes three service divisions each using a 4300P. SG&P Advertising—a full service advertising, marketing and design agency. Sun Graphics and Publications—a design and production art studio employing professional electronic systems for high quality. 4 color brochures, catalogs and ad design. MacSunSet® - a desktop publishing and PostScript imagesetting service bureau for design professionals.

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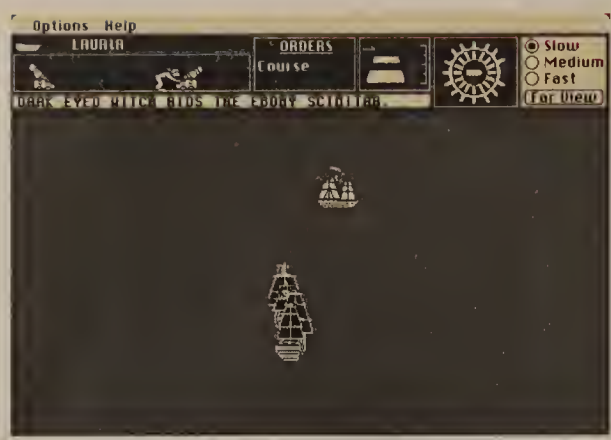
Linotype is a registered trademark of Linotype Corporation.

The Varityper advertisement reproduced above appeared in the June, 1989, July, 1989 and August, 1989 issues of MacWorld. The advertisement inaccurately portrayed the comparisons conducted by Varityper's customer, Ralph Volk, in his evaluation and purchase of a PostScript imagesetter. Mr. Volk neither had nor cancelled a purchase/license agreement for a Linotype PostScript imagesetter. He did not test Linotype's current PostScript imagesetter, the Linotronic 300 recorder with RIP 3 processor, and he made no head-to-head comparison of that imagesetter with the Varityper 4300P PostScript imagesetter. We regret these inaccuracies and any confusion they might have caused.

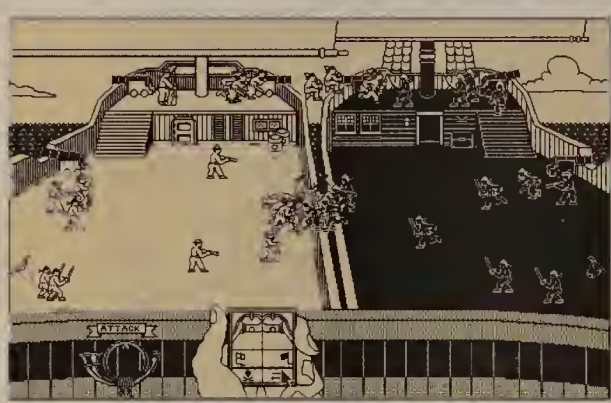
Varityper's message, then and now, is that before you conclude the purchase of a PostScript imagesetter, make your own comparisons. We urge you to speak with representatives of Varityper and Linotype and accurately evaluate each company's products.

Circle 483 on reader service card



Crossing the T

When encounters occur, zoom in to direct the battle. Here, a frigate takes on a ship-of-the-line being aided by a flagship. The frigate is crossing the T—raking the enemy's stern with cannon fire. In this position, the enemy ships cannot return fire. Note the ship's wheel, which is used for steering, and the sail and wind indicator at the top of the window.



Flying across the Breach

Command your musket-toting marines and cutlass-brandishing sailors to seize the enemy ship while defending your own. You move sailors by pointing and clicking in their general area and then again in the area you want them to move to. The card in the hand at the bottom of the screen provides another way to direct your crew. Victory is won by defeating the enemy crew or taking the flag.

ships without risking return fire. But take care, for directing your ships into the wind can slow or stall them. The manual offers invaluable advice on effective tactics for the attack.

If you are hit by cannon fire, your sails or hull will become visibly damaged. Damage to sails will slow a ship down and eventually disable it. Ships will sustain damage if hit by cannon fire, if they collide, or if their supplies drop below 20 percent of what they started with. Increasing damage to the hull will eventually sink a ship. A disabled or grappled ship cannot be directed, so it will drift in the direction of the wind. If you disable an enemy ship, it will strike its colors without a fight. The enemy crew automatically makes minimal repairs to allow the enemy ship to rejoin the action, but as part of your fleet. To repair a ship that is severely damaged, it must have over 20 percent of its original supplies, and it must be brought to a repair port. If a ship has less than 20 percent of its supplies, you must bring it to a supply port. Once a ship's condition improves, you can return it to action.

When two battling ships get close enough, one will attempt to take control of the other by capturing its flag or by defeating its crew (see "Flying across the Breach"). It is possible to take an enemy ship that's undamaged, but this is far from easy. When you do win a grapple, you may let loose a rousing "hooray" along with your animated crew.

Meet the Fleet

Three types of ships are involved. Frigates are light, fast, and highly maneuverable ships, useful for patrolling shallow waters—but they are much more vulnerable to damage by cannon fire and will sink in rough water. Ships-of-the-line have twice the firepower of frigates and can sail in rough seas, but they sink in shallow water. Flagships are similar to ships-of-the-line, but can deliver and take even more punishment, and they also have more strategic value than the other ships.

The Ancient Art of War at Sea comes with a game generator that you can use to re-create historic battles or cut loose and design your own scenarios. The documentation takes you through this feature step-by-step, but the game generator functions so logically, you may not need it.

Pass the Grog, Matey

The Ancient Art of War at Sea's challenge combines the strategic planning of conventional war games with original arcade-like sequences that will keep your adrenaline pumping. Its authors Dave and Barry Murry have succeeded in creating an exciting and elegant window into another age. The game is both simple to play and challenging to win. The manual is instructive, educational, and entertaining to boot.

—Otto Waldorf

See Where to Buy for contact information.

MINICAD+ 2.0

Computer-Aided Drafting Program

Pros: *Relatively easy to learn; simple 3-D tools; integrated spreadsheet for parts list; MiniPascal language with strong graphics features; DXF translator included.* ***Cons:*** *Plotter support sold separately; some 3-D functions slow even on Mac IIx.* ***Company:*** *Graphsoft.* ***Requires:*** *512KE; 1MB RAM; second disk drive. Hard disk recommended.* ***List price:*** *$695.*

During the past two years, drafting features that used to be confined to the most expensive professional Macintosh CAD programs started to appear in packages costing just a few hundred dollars. Claris introduced a 2-D CAD package, Claris CAD, which was much more than just "MacDraw II Plus" and became the 2-D features leader. The widespread availability of larger screens and color have also made Macintosh CAD competitive with more traditional CAD on workstations or on minicomputers with graphics terminals.

MiniCad+ 2.0, a refinement of Graphsoft's earlier 1.0 upgrade to its original MiniCad 3-D program, offers a complete set of 2-D drafting tools; a straightforward collection of methods for producing wire-frame and solid 3-D figures; a language for programming custom tools; and a spreadsheet for several tasks, of which automatic generation of parts lists is probably the most impressive (see "Life at the Top").

The Complete Line

MiniCad+ is competitive with Claris CAD in terms of the number of drafting tools included. Besides the basics found in MacDraw-type programs, it offers multiple drawing layers, the number limited only by RAM; snapping to defined geometric positions and objects; the ability to change units and scale easily; flexible dimensioning, including angular dimensioning and some user-defined styles; bezier and cubic-spline curve definition; center, radial, and diametral drawing of circles and regular polygons; keyboard numeric

(continues)

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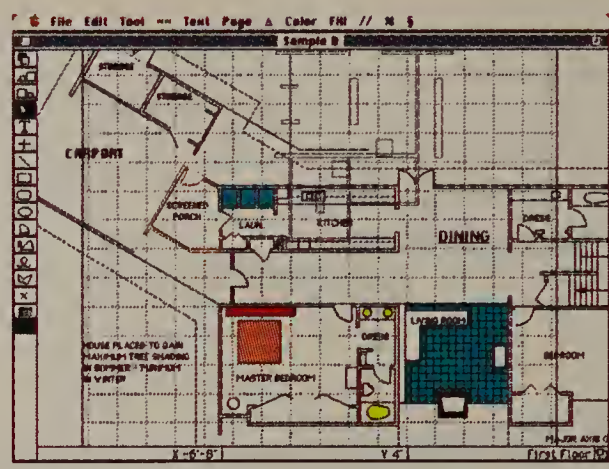
input for high-precision work; trimming, aligning, filleting, grouping, joining, adding and subtracting objects, custom cross-hatching, and multiple-line definition; complete use of Mac fonts with unrestricted text positioning; creation of reusable symbols; and a programmable Duplicate feature, to make scalable copies of objects according to user-defined arrays or rotations.

The scope of this features list puts MiniCad+ in the ranks of the most thoroughly implemented 2-D CAD programs, well ahead of Generic CADD, MacDraw II, and MacDraft, and a bit ahead of Dreams. Version 2.0 extends the program's drawing aids significantly, with a Constraint Palette for specifying user-defined snaps and drawing rules—both of which are useful for drawing concentric or parallel objects, objects distributed along angles, or tangents to curves. Mirroring and Smart hatching to keep hatch lines from intersecting objects have also been added.

The program also handles standard paper sizes A through E, although to get full-scale hard copy you must purchase either a basic (A, B) or professional (A–E) plotting package; these are basically custom variants of MacPlot, from Graphsoft. DXF format translation is now included, linking MiniCad+ to the world of AutoCAD—the dominant IBM PC program. (MiniCad+ also imports text, MiniCad 3D, and PICT (object or picture) files, and exports PICT, EPS, and text.)

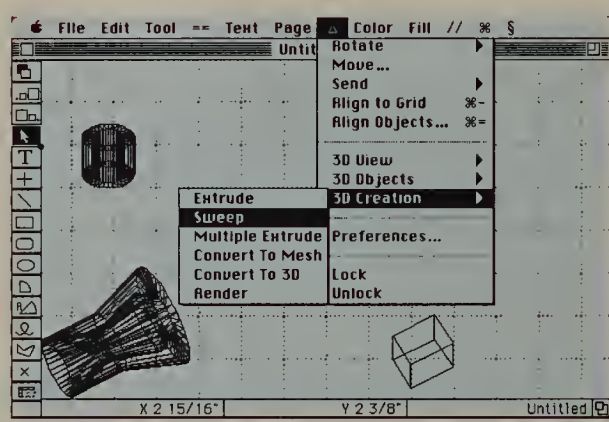
The MiniCad+ core could stand a few minor improvements. Except for the section on MiniPascal, MiniCad+'s documentation is fairly basic. Also, there's no help facility; there is a HyperCard tutorial, but it is an extra-cost option. Misuse of commands can occasionally make the program hang instead of generating a beep. There's no way to escape from the middle of most operations, and the program could use a multilevel Undo (the industry seems not to have noticed that all drafting programs need this feature).

Should you find you require a drafting tool not provided by the program, Graphsoft has included a programming language called MiniPascal (which is actually more useful as a high-level macro toolkit than a from-scratch programming language) for writing custom routines. This is not as difficult as it sounds, since MiniPascal has a rich set of graphics procedures (apparently a generous chunk of the source code of MiniCad+ itself) and an exceptionally clear manual with enough examples to get you started. Programs developed in MiniPascal can be named and entered under the CMD symbol menu and used as standard menu items. Although users with no previous programming practice will probably need a good beginning Pascal book for reference, experienced programmers will find MiniPascal allows easy construction of simple, but useful, combinations of other MiniCad+ operations.



Life at the Top

This architectural drawing shows a few color touches added to highlight objects and further distinguish them from other grayed layers. A MiniCad+ drawing can have as many layers as you can accommodate in memory and as many symbols as you care to define.



Living 3-D

Generating a 3-D figure in MiniCad+ is simply a matter of drawing a 2-D object and then sweeping or extruding a 3-D object. Wire frames can then be depicted as standard solids with the Render command.

On the Grid

The spreadsheet in MiniCad+ is really a specialized graphing-data aid. To link it to a drawing, you select the gridlike tool at the bottom of the Tools palette. Although each spreadsheet holds only 254 cells, you can do some nice things within this limit. For example, when you select an object in the drawing, a function called Count determines the number of times the object appears. The use of this function in automatic bills of materials is obvious, and you can export this data via the Clipboard to real spreadsheets. The spreadsheet is also handy for computing drawing-linked areas and volumes, and calculating keyboard-entered dimensions.

3-D without Glasses

MiniCad+ does not offer an assortment of 3-D solid objects like In-CAD, or 3-D shading like MicroStation Mac, but those programs cost more and call for high-end hardware. In MiniCad+, wire-frame 3-D objects are generated by first defining a 2-D object and then sweeping it around a locus or extruding (stretching) it (see "Living 3-D"). The Render function removes hidden lines and gives you a solid view of the 3-D object. Rotating, redrawing, and rendering 3-D objects takes from just a few seconds to a few dozen seconds, depending on an object's complexity. To be fair, removing hidden lines in making a pseudosolid from a wire frame is a complex calculation, but for MiniCad+ to compete in the 3-D big leagues would require that the 3-D parts of the program be rewritten in assembler, bypassing QuickDraw and effectively eliminating user access via MiniPascal. Graphsoft has chosen ease of use and modifiability over screaming 3-D performance, a choice that's quite appropriate for many architectural and engineering users.

You get a lot for your money with MiniCad+. The program competes with high-end 2-D drafting programs that cost as much or more, and offers solid additional features in its MiniPascal language, drawing-linked mini-spreadsheet, and 3-D object generation. Additionally, MiniCad+ will run on any Mac having at least 1MB of RAM. For users who don't require full-blown workstation-style 3-D solids modeling but would like a nicely enhanced, complete 2-D package, MiniCad+ is highly satisfactory.—*Charles Seiter*

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PC MACTERM/NETWORK 1.2

Software for Macs to Control Networked PCs

Pros: *Good way to provide MS-DOS capabilities to networked Macs; conversation mode useful for collaborative work; password security for controlling access to PC; support for routing PC PostScript output to Mac.* ***Cons:*** *Only one file can be transferred at a time; PC program supports either AppleTalk or modem access, not both; only CGA graphics supported; might conflict with RAM requirement of some PC programs.* ***Company:*** *Dynamic Microprocessor Associates.* ***Requires:*** *Mac Plus; IBM PC or PC clone; AppleTalk interface card for PC; LocalTalk wiring or equivalent.* ***List price:*** *$395.*

PC MacTerm/Network is a Mac program that provides a window for mimicking an IBM PC's display. Anything you type in that window is sent to a networked PC and is processed by the PC as if the data had been typed on the PC's keyboard. The result of your typing, such as the execution of a DOS program, is transmitted back to the Mac's window as well as being displayed on the PC's monitor.

Speaking MS-DOS on the Mac

In order for all this to work, you need to have a PC with an AppleTalk card and its companion program, pcAnywhere. When you open PC MacTerm/Network on the Mac, you can select any networked PC running pcAnywhere and execute MS-DOS commands on the selected PC (see "Making the Selection").

Version 1.2 of PC MacTerm/Network supports the CGA graphics mode as well as the PC character display. PC MacTerm/Network also maps the function keys of a PC keyboard to the Mac keyboard. You can then use the Mac's mouse to select any of the PC function keys and PC cursor keys from the Keypad Menu. You can also control the PC's cursor movement with the Mac's mouse; if you ⌘-click a location, PC MacTerm/Network sends the appropriate cursor keystrokes to move the PC's cursor. You can also use the Mac mouse to copy and paste selected text.

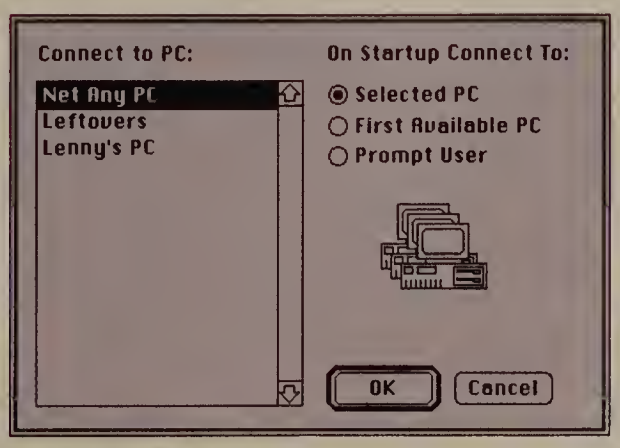
Central Control

Running on the PC's pcAnywhere allows you to set options for the PC's name (for identification purposes), keyboard mode (both keyboards active, only host keyboard active, or only remote keyboard active), and time-out periods for logging off inactive users. In addition, with pcAnywhere you can create a list of allowed names and passwords for users who wish to connect to the PC. This list also includes an option that allows pcAnywhere to log any caller's session. Once you have configured pcAnywhere to your liking, you can set it up to stay active in the background.

PcAnywhere is the latest generation of a program originally designed to allow PC users with modems to dial in to a PC and control it, much as Macintosh users can with Farallon's Timbuktu/Remote. Now that pcAnywhere supports Mac access over an AppleTalk network, the new program provides other PCs that are part of the same network with similar capabilities (the PC program is called ATERM). Thus one PC running pcAnywhere can store and run special programs, such as Lotus 1-2-3, available to Macintosh users and PC users alike.

Moving Data

ASEND is included in pcAnywhere for transferring files. Unfortunately, you can only select Mac files one at a time; the file-selection dialog returns after a file is transferred and you stop the transfer process by selecting the Cancel button in the dialog box. I would much rather have a way to select multiple files (for example, shift-clicking or selecting a folder) for transferring files from the Macintosh. PC MacTerm/Network's gauge roughly shows the file-transfer progress. Background file transfers with MultiFinder are fully supported.



Making the Selection
This simple window on the Mac displays all networked PCs currently running pcAnywhere. You can choose to connect always to the same PC or to the first one available.

You can also use PC MacTerm/Network to redirect PC printing jobs to any printer, including a LaserWriter, attached to the Mac. Output directed by pcAnywhere to the PC printer port LPT1 is converted by PC MacTerm/Network to a file called PC Printer on the Mac. If PC Printer file already exists, you are asked to assign a different name to the new file. If your DOS applications can generate PostScript files, those files can also be directed to the LaserWriter via this LPT1 mechanism. Once the output has been spooled to the PC Printer file on the Macintosh, PC MacTerm/Network asks you which font, font size, and tab setting you want to use.

PC MacTerm/Network supports a conversational mode that allows remote and host users to type messages to each other on the screen—a good way for Macintosh and PC users to collaborate without the excessive transfer of files between machines.

The Right Choice?

At $395 PC MacTerm/Network and pcAnywhere is a nice way for Mac users to run MS-DOS programs without having to buy a coprocessor card, but it's considerably more expensive than a competing program called MacChuck from Vano Associates ($100). PC MacTerm/Network's advantages lie in password-controlled access to the PC and password support for both PCs and Macs, while MacChuck transfers files faster over the network.

If you occasionally want to run MS-DOS programs in a window on the Mac, I'd recommend MacChuck. On the other hand, if you have a combination of Macs and PCs and want to run DOS programs on either a Mac or a particular PC, or are concerned about security to that PC, then PC MacTerm/Network is your best choice.—*David Kosiur*

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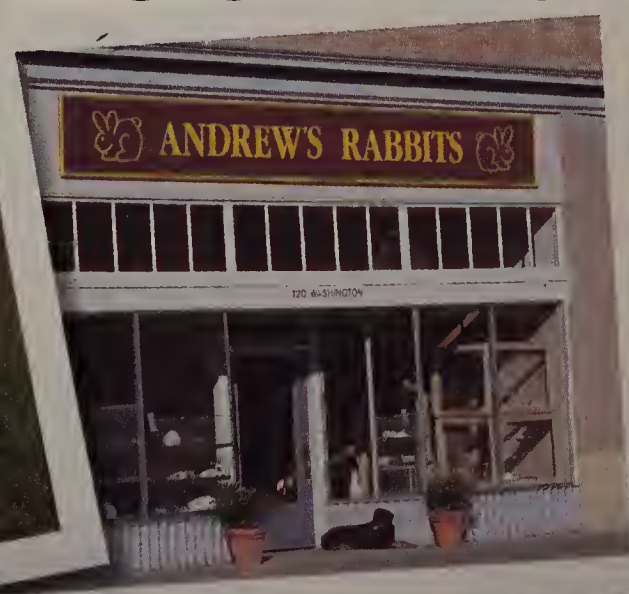

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FOR THE RECORD 1.0

Personal Record-Keeping Program

Pros: *Extremely well documented.* ***Cons:*** *No data import or export.* ***Company:*** *Nolo Press.* ***Requires:*** *Mac 512KE.* ***List price:*** *$49.95.*

FAMILY MATTERS 1.0

Personal Record-Keeping Program

Pros: *Fully customizable; easy data import and export.* ***Cons:*** *Slow; distracting graphics; bare-bones manual.* ***Company:*** *Springboard Software.* ***Requires:*** *Mac Plus; HyperCard 1.1.* ***List price:*** *$49.95.*

For the Record and Family Matters are two competing electronic answers to the ancient problem of how to organize important home and family information. Both programs have main menus that offer sections on topics such as family records, medical records, financial information, employment history, insurance, trusts, vehicle information, child care, pet care, and home inventory. They also both offer submenus for most of the main categories. Under vehicle information, for example, they list vehicle identification numbers, license plates, insurance information, and repair and service records. Both products have places in which to record employment records, birth records, and family tree information. They also treat home inventory, savings accounts, and emergency contacts similarly.

The most important difference between the two products is documentation. The 200-page manual included with For the Record is rich in detail, and its contents are presented with a good sense of humor. Full of practical advice about family legal and financial matters, For the Record's manual offers considerably more information than you'll probably ever use. Family Matters' 50-page booklet, on the other hand, simply explains the software and lists category information.

For the Record

For the Record is a stand-alone application, with a database dedicated to family record keeping. It offers 27 categories, including emergency information, pensions and retirement, securities, objects of value, locks, personal documents, death plans, and wills. In addition, 200 subcategories appear according to which main category is selected. For instance, Child Care and Living Will show when you select Emergency Information (see "Just in Case").

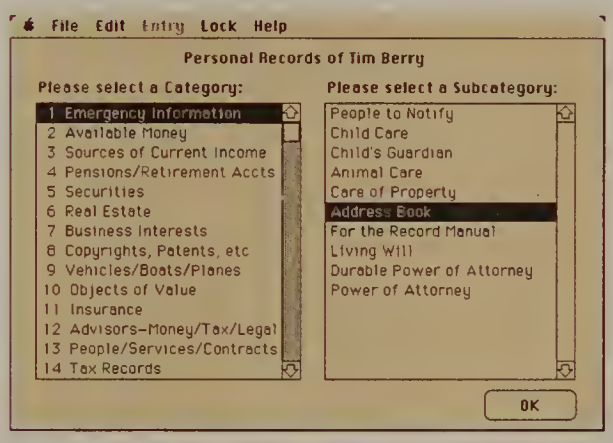
For the Record is not programmable, so you cannot create your own categories or modify either the data displays or the organization of categories. The program does, however, allow you to post miscellaneous notes on any record in the database. It also offers a simple cross-referencing system. I particularly liked the way For the Record compensates for the fact that you probably won't want to keep all your records in the computer, by including space for listing the physical locations of documents like address books and birth certificates.

Family Matters

Because Family Matters is a set of HyperCard stacks, it is easily customizable. You can create your own links between the pieces of information you enter, and you can use HyperTalk to easily import and export data. One stack provides a database for listing the same kind of basic information that's included in For the Record. It divides data into five categories (family members, household, financial, vehicles, and pets), which in turn are divided into several dozen subcategories. Family Matters dresses up a simple database application with some nice graphics, but it's slow.

In addition, the buttons are sometimes confusing. For example, the main menu card hides the category buttons in the picture (see "All in the Family"). You must click on the car to go to vehicle information, the dog for pet information, and one of the kids for family members. By pressing Option-⌘, I was able to see where the buttons are hidden, otherwise I would have been forced to read the manual or use the main menu. Another problem with the interface is that the Search button icon promises an information map, but delivers nothing more than a simple HyperCard find routine. What's more, all of the information screens lack navigation buttons for returning to the main menu, a glaring omission in any HyperCard application.

All in the Family
The Family Matters main menu screen hides category buttons in the drawing. Although it is a nice implementation of HyperCard's graphic possibilities, this artwork makes it difficult at first to navigate the stack, since it is not clear that the figures in the drawing are also buttons that lead you to selected main topics.



Just in Case
In For the Record, subcategories appear when you select a category from the main screen. After selecting Emergency Information, select the Address Book, to look up important numbers.

A Wealth of Information

Unless you're already well organized and on top of the legal and financial implications of personal record keeping, For the Record has a lot to offer. Family Matters offers essentially the same features as For the Record, plus the added advantage of HyperCard flexibility and programmability, but nothing like the same wealth of documented information.—*Tim Berry*

See Where to Buy or circle 769 (For the Record) or 757 (Family Matters) on reader service card.

Wherever your Apple LaserWriter II is now perched, we offer this attractive alternative: The Organizer,™ from CoStar.

You may have a hard time determining where one ends and the other begins (as some Macintosh experts did), but that's not so surprising. The Organizer was created by a member of the design team responsible for the LaserWriter. It is the exact same color. And has the exact same finish.

It is Apple to the core. In form. And function.

Take those shelves for instance. Think of the reams of paper you could store there. The extra paper trays. And toner cartridges. There's even a special place in back for a hard disk drive. And a wire management system that keeps everything nice and neat.

And those hefty wheels. They make it easy to move the whole operation down the hall. Or to park it in a closet overnight for safekeeping.

The Organizer from CoStar. We think it could do wonders for your organization.

The Organizer comes with a lifetime warranty. To order one, or to find out the dealer nearest you, call 1-800-426-7827. (In Connecticut, call 661-9700.)

CO STAR

CoStar Corp., 22 Bridge Street, Greenwich, Connecticut 06830 Fax: 1-203-661-1540 **Circle 487 on reader service card**

ACTA ADVANTAGE 1.0

Outlining System

Pros: *Mixes type styles within a topic; stores graphics; provides eight format drivers for easy import and export of data; lets you set page breaks.* ***Cons:*** *None.* ***Company:*** *Symmetry Corporation.* ***Requires:*** *Mac 512KE; System 6.0 for mixed fonts within topics.* ***List price:*** *$129.*

Acta has always been designed to make the process of entering your ideas as they come to mind intuitive and easy. Its latest incarnation, Acta Advantage, adds a stand-alone application and several impressive outlining features. Reorganizing topics is still as easy as pointing to a topic, clicking the mouse, and moving the topic to its new location; and keyboard commands are still plentiful and logical.

A Powerful Family Tree

Outlines in Acta Advantage, like those of the original Acta, are organized in a hierarchical, top-down structure. A family metaphor is used to describe the relationship of each level. At the top level of the outline are mother topics; below these are sister topics; below these are daughter topics. Each of these levels is indented further to the right.

The Best of Both Worlds

Two new additions to Acta are the ability to mix type styles within a topic and to set page breaks to differentiate topics in an outline. While including everything that the desk accessory offers, Acta also includes several new printing options. You can add headers and footers, place rectangular boxes around an outline, and create custom topic labels. You can also view these labels on screen, open up to nine windows at once, search and replace items in an outline, and sort daughters as well as sisters.

The difference between the DA and the application is simply one of working style. If you want to do most of your outlining while in the middle of other projects, the DA is for you. You'll need the application if you want to open up outlines from the desktop; have a to-do list, phone list, or do extra formatting on your outlines. Either way Acta is a flexible, easy-to-learn outlining environment. Files created in either the DA or the application are accessible to both.

A Versatile Tool

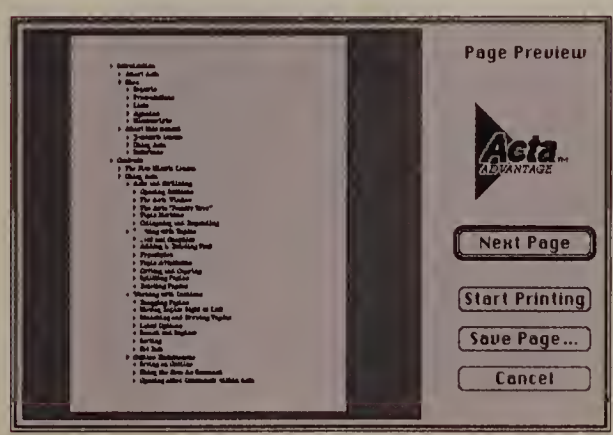
Acta can store graphics as well as text. You just enter a few keywords as the mother topic and paste in a graphic as a daughter. To locate what you've stored, use the Find command to search for keywords and the graphics are readily available.

One of Acta's nicest features is its ability to import and export data in various formats. The program provides format drivers for Microsoft Works, More, WriteNow, ThinkTank, Microsoft RTF, Scrapbook, and MailMerge (tab- or comma-delimited text). Text output and MacWrite formatting are built-in, so no extra driver is required.

In case you use an application for which Acta doesn't have a format driver, Smart Paste allows you to import text from any application through the Clipboard, separating each line that ends with a return character as a new topic.

Although some competing programs offer more features, Acta's easy reorganizing of topics, support for custom labeling, built-in sorting and searching, and easy-to-learn hierarchical structures make it the outliner of choice. —*John Gillett*

See* Where to Buy *or circle 701 on reader service card.



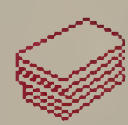
Picture Perfect

The Page Preview option in the Acta application allows you to preview an outline on screen. By clicking the Save Page button you can save a PICT image of an outline and send it electronically to someone who does not have Acta.

STELLASTACK 1.0

HyperCard Front-End Simulation

Pros: *Provides easily customized, user-friendly front ends for STELLA models; many good examples.* ***Cons:*** *HyperCard is memory intensive; simulations are slower than if created with custom XCMDs.* ***Company:*** *High Performance Systems.* ***Requires:*** *Mac Plus; STELLA 2.1.* ***List price:*** *$295.*



Simulating real-world events is one of the pet dreams many people have for their computers. High Performance Systems' program, STELLA, lets you hook together interrelated icons—representing tanks, pipes, and valves—to simulate any situations you can cook up—be it economies, ecologies, factories, or whatever. The content level of the tanks rises and falls as the simulation progresses. While STELLA's plumbing metaphor is very functional, its raw, back-room flavor doesn't make the simulations very presentable to the uninitiated. STELLAStack solves this problem by giving the STELLA user all the software needed to create a HyperCard front end in which sliders, dials, animated pictures, and displays hide STELLA's plumbing, making simulations dynamic and fun to watch.

First Things First

Anyone who wants to use STELLAStack must first be familar with building a simulation with STELLA. The process is not difficult. You just represent the variables in your world as tanks. You program the way the items interact by hooking pipes between tanks and mathematically describing how the two levels in the tanks interact. STELLA sets the initial levels of the tanks to your choice of values, runs the simulation, and lets you watch as the simulated world changes. The STELLA manual gives plenty of examples of good models for everything from eighteenth-century France to the corporate job market.

STELLAStack comes with a boilerplate stack; different generic input and output

(continues)

Traditional Typesetting vs. 1000 dpi Plain-Paper Typesetting

What you see in the top photo is a traditional type shop, complete with a bulky developing system, toxic chemicals, long rolls of expensive photo-sensitive paper, clean-up supplies, the works.

In the second picture, you are also viewing a complete typesetting system. But with this system, you compose your type with a Macintosh, and you output your type on a **LaserMAX 1000** plain-paper typesetter.

MAXimum Resolution

What's so phenomenal about the LaserMAX 1000 is **1000 x 400 dpi** resolution on plain paper. This means that you can create to your heart's content and print as many variations as you want, at only pennies per page. And with resolution this good, you use plain-paper pages for *final* copy–not just for proofing copy. (Say good-bye to all the toxic chemicals and bulky developer and cluttered clean-up supplies. *And* to the *expense* of all those things!)

MAXimum Speed

The LaserMAX 1000 isn't simply GOOD. It's also extremely *FAST*. Because our engineers don't believe in sacrificing print speed–*EVER*. Most pages print in just SECONDS, even when they contain complex graphic images or unusual layouts. Or lots of typefaces. Or lots of type sizes. (As low as 2 point. As high as 2000 point. Or even *higher*.)

MAXimum Affordability

The LaserMAX 1000 costs less than you would think. At a complete price that's under $8,000, you pay less than HALF of what Varityper charges for its 600 x 600 dpi printer, the VT600P. (And remember: the LaserMAX 1000 provides higher resolution and is 10 times faster.)

If you've been waiting for a *plain-paper* typesetting solution that you can enjoy right now with your Macintosh II, IIx, or IIcx, there's simply NOTHING that comes close to the LaserMAX 1000. It out-performs them all, at a price that can't be beat.

LM LaserMAX Systems™

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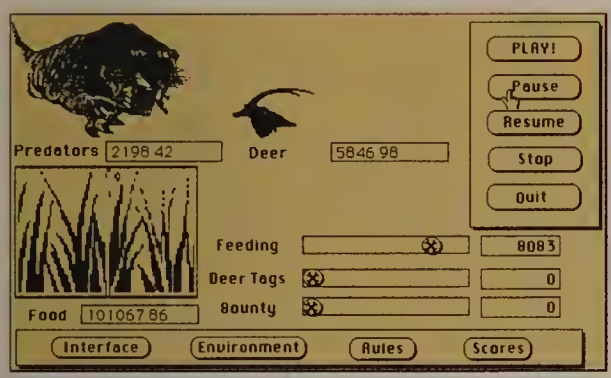
(612) 944-9696 Fax: (612) 944-9151

Circle 342 on reader service card

Macintosh Plain-Paper Typesetting—Fast!

This ad was set with plain-paper type on the LaserMAX 1000!



Predators 5, Deer 1
In this screen, the graphics depict the plight of the deer, vastly overmatched by their predators at this cycle of the simulation. The slider settings for Feeding, Deer Tags, and Bounty affect the predator/prey interaction. It is your role as a resource manager to balance the demands of the competing interest groups in the area.

devices, for example, sliders, buttons, and dials; and a number of clever, completed projects that serve as inspiration and example. In order to use the front end and interface, though, you must also have STELLA, because it still performs the actual simulation calculations. The STELLAStack manual assumes that you already know how to use STELLA, teaching you instead how to hook up a simulation model to HyperCard.

Life and Death on the Kaibab Plateau

The examples are the most valuable part of STELLAStack. One of the best is a simple model of the ecology of the Kaibab forest near the Grand Canyon. There are coyotes, deer, food, and hunters; and you control the bounty on the predators, the number of hunting tags for the deer, and extra food by using sliders to set the initial levels of each. The stack feeds the current settings of the sliders to the STELLA kernel, which computes the population changes based on the model of the ecology developed with STELLA. The simulation of almost forty years of this simple ecology finishes in under two minutes on a Mac II (see "Predators 5, Deer 1"). When the simulation is over, the stack graphs the populations and provides an analysis of the ecological changes over time. All of the dials, slides, and animations can be cannibalized for your own stacks.

Convenience versus Speed

A skilled HyperCard programmer could duplicate the work of STELLAStack with external commands and functions written in Pascal or C. Such external commands would run faster than STELLAStack because they would be optimized for the particular problem at hand. The development time would certainly be longer, however, because everything would need to be done from scratch.

STELLAStack will be useful for anyone who wants to create a presentable simulation quickly and simply. It is easy to show charts emphasizing a point, but a computer simulation running in real time can be much more convincing. You can create practically any world inside your computer and set the rules that govern it. Right now, I'm working on one in which hard work and honesty are rewarded while corruption and evil meet their just ending.—*Peter Wayner*

See Where to Buy or circle 877 on reader service card.

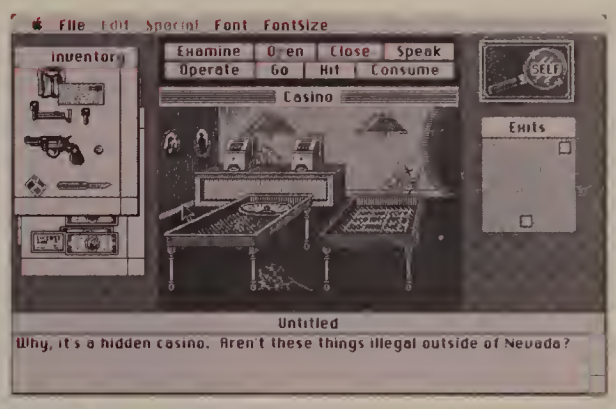
DÉJÀ VU II: LOST IN LAS VEGAS 1.0

Mystery and Adventure Game

Pros: *Extremely interactive and challenging graphics; requires no knowledge of original Déjà Vu.* ***Cons:*** *In some instances, next step defies ordinary logic, making the purchase of the $5 hint book virtually mandatory; copy protected.* ***Company:*** *ICOM Simulations.* ***Requires:*** *Mac 512KE.* ***List price:*** *$49.95.*

After being bashed over the head, you awake in a Las Vegas hotel room to find your life in disarray. Mobster and casino boss Tony Malone is convinced you have swindled $118,000 from his bookie operation—and has given you just a few days to set things right. With only $17.25 to your name, you must wind your way through a thicket of deceit and amass enough evidence to convince Malone of your innocence—before he sends his hired thug Stogie Martin to settle the score for good.

To succeed, you'll need to uncover secret rooms, deal with cops—and even find enough dough to support your travels. Along the way, letters, keys, books,



Hidden Casino
A vital clue awaits you in this secret casino. The pressing question: Can you find it?

and other objects that may provide clues will be unearthed. You'll need to decide which things to keep and which lines of inquiry to pursue. You'll probably die a few times, too.

By using the commands listed along the top of the screen—Examine, Open, Close, Speak, Operate, Go, Hit, and Consume—you'll be able to manipulate objects and situations. Simply clicking the mouse shows you what you are carrying. Need to pay for a train ticket? Just drag some money out of your wallet and give it to the conductor. Want to examine something? Double-click on the object and a window at the bottom of the screen describes what you have seen. Need to leave through a door? Just point to it and click twice. As long as it's open or unlocked, out you go.

Gentle Reminders

In describing Déjà Vu II it is difficult to give many hints without spoiling the fun. A standard rule is to examine everything and collect anything that might remotely help you. It might also be prudent to save things even after they have been successfully used. You never know when you might want to backtrack a bit.

Déjà Vu II is not the perfect interactive game, but it is a superior effort. By keeping your wits about you, and not consulting the hint book too often, you should enjoy hours of solid fun and adventure with Déjà Vu II. Remember, the problem with all adventure games is that once you've solved them you can't really go back, so take your time, don't cheat, and enjoy the challenge of saving your own life.—*Bob Buderi*

See Where to Buy or circle 740 on reader service card.

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"**MultiLedger** is ideal for the small business. It's easy to set up and use and has an amazing set of accounting features when compared to other programs that cost more and don't offer much more power."
***MACazine** / March 1989*

"I don't know of any other Mac accounting software which contains so many features and modules for the price."
***Computers in Accounting** / January 1989*

"A welcome and impressive bonus is the **Payroll** program which can be linked to **MultiLedger**.... **MultiLedger** and **Payroll** are a bargain for companies that don't need a networked system."
***MacUser** / April 1989*

"Our favorite package was **MultiLedger**.... it's the most elegant, usable and Mac-like of all the packages we reviewed.... CheckMark offers unlimited free telephone support to all users. This policy would lead to bankruptcy if the program were as confusing as others."
***The Macintosh Buyer's Guide** / Spring 1989*

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WINDOW SHOPPING

by Lawrence Stevens

This month I look at a tool to help create flowcharts, a hard disk security system, a HyperCard stack that can help organize Mac tools, and another stack that will store HyperTalk scripts

RON CHAN

Flower 1.03

Flower ($39.95 from Iota) provides a quick way to create programming flowcharts using 18 standard flowcharting symbols. While Flower looks like a standard Mac drawing program, it doesn't require artistic skill. Instead of drawing flowchart symbols, you place them by clicking on the symbol tool and then clicking where you want the symbol to go.

Once a symbol is on the screen, you have some editing options similar to those in drawing programs, but there are also a number of restrictions. For example, you can relocate an object, but you can't resize it. You can enter text either inside or outside a symbol, but to edit the text you have to delete by backspacing from the end of the text. You can connect symbols with the line tool, but once a line is drawn, you can't eliminate just the line. To remove the line, you also have to eliminate the symbol to which it's connected. While these restrictions give you less control over the look of the document, they make it easier to create a uniform chart with no extraneous lines and with all the symbols the same size.

The Offpage Connector, an automatic feature, is a standard flowcharting symbol used to indicate that the chart continues on another page; it also allows you to link, through a dialog box, one Flower document to a second one. Once you've created the link, whenever you Option-click the Offpage Connector symbol, the current document closes and the linked page automatically opens.

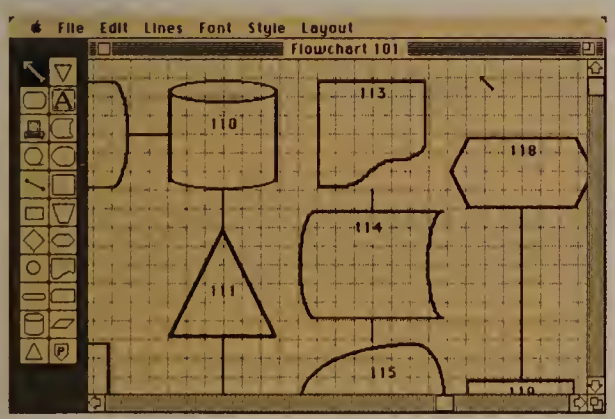
Because Flower lacks drawing tools, if you need a flowchart symbol that is not included, you must create it in a drawing program and then paste it into Flower from the Clipboard. However, because custom symbols do not work as Flower symbols—for example, they are not automatically aligned or sized—they are difficult to work with. Another problem with Flower is that the entire screen gets redrawn whenever you select or move a symbol (if you select a symbol and then move it, the screen gets redrawn twice). This makes the program slow and cumbersome if you need to do a lot of editing. A final problem is the fact that you can only have one window open at a time, making it difficult to edit multiple-page flowcharts.

Despite its shortcomings, Flower is much easier to use for flowcharts than, say, MacDraw or MacPaint. If you confine your flowcharts to Flower's 18 symbols, this program will speed up your flowcharting tasks dramatically (see "Flower's Symbols").

HyperOne

Despite the revolutionary technology in HyperCard, most commercial stacks are still take-offs on standard Mac applications. HyperOne from Hyperpress Pub-

(continues)



Flower's Symbols

The palette that appears along the left side of the screen contains Flower's 18 flowchart symbols. The Lines menu allows you to place arrows at the start or end of lines. The Layout menu allows you to move objects closer or farther away, toggle the grid on and off, and see an Overview (zoomed-out, full-page view) of the chart.

Creating HyperOne Cards

To install an icon on this card, first click on the Install button. You can install up to 6 icons: applications, DAs, HyperCard stacks, documents, or notes. Your selection's icon replaces the Install button. You can access any item by clicking on its icon. The control button (at the upper left of each icon) lets you rename, delete, or Get Info.

lishing Corporation ($49.95), on the other hand, provides a totally new way of working with the Mac. It allows you to create a card from which you can easily access all the applications, DAs, documents, stacks, or notes you need for a particular project.

For example, suppose you are responsible for two separate tasks: creating brochures and billing clients. You would create two Sections, one for each task (HyperOne handles up to five Sections). In the brochure Section, you might create one card for each project (up to 16 per Section). In the billing Section, you might create one card for each month of the year. You could then place buttons on each card in the brochure Section for a word processor, a page layout program, the alarm clock DA, a calculator DA, a drawing program, and each document you created for the brochure (see "Creating HyperOne Cards").

On the monthly billing cards you could, for example, place buttons for an accounts receivable application, a word processor, your HyperCard address stack, and notes in which you type the name of all the clients billed in the last month. You launch or view any of the items on the cards by clicking on its icon in the Home stack.

HyperOne saves you from having to go through layers of folders to find the items you need.

Hard Disk DeadBolt 1.0

Hard Disk DeadBolt from FWB ($89.95), available either bundled in a DA or by itself, can encrypt a file, a folder, or a set of files and folders that you specify and name. The program gives you three encryption options: DES (data encryption standard), a standard method of encryption; QuickBolt, which is not quite as secure as DES but is about six times faster; and AppLock, which is for applications only and takes about one second per application.

To use Hard Disk DeadBolt you need only specify the encryption method and click on the Encrypt button. You then select the files, folders, or combination you want encrypted, and type in a password.

Hard Disk DeadBolt Options
After selecting any of the four buttons on the right, all relevant files and folders are displayed. When you click on the name of a file or folder, you are asked for a password, after which Hard DiskDeadBolt encrypts or decrypts the file or folder. If the Use Batch Mode check box is selected, you will only be able to view batches (groups of files or folders that have been named as a batch). The radio buttons specify the encryption method.

Another handy feature of Hard Disk DeadBolt is Blackout, which you can use when you are leaving your computer for only a few minutes; you enter a password, and the program freezes and blackens the Macintosh's screen until the password is retyped.

In terms of user interface, there are basically two types of security applications. One type, like Hard Disk DeadBolt, requires that you enter a password each time you encrypt or decrypt a file (for the highest level of security you could use a variety of passwords). This is bothersome and time consuming, but it provides a high level of security. The other type of security programs simply require a password on log-in, which could put your files in jeopardy should someone discover your password or find your Mac on but unattended. If you choose the individual password method, Hard Disk DeadBolt works well and is a good value for the price.

ScriptLibrary

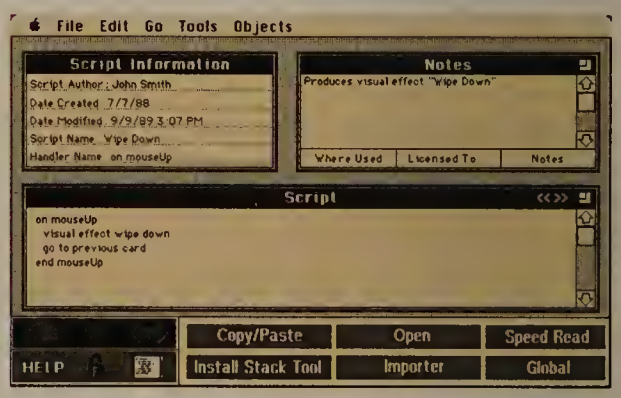
Another program from Hyperpress Publishing Corporation, Script Library ($49.95), provides the best way I have found to store HyperTalk scripts. There are two ways to place your scripts in ScriptLibrary: you can copy the script to the Clipboard and save the script in ScriptLibrary or you can use the Import button to have ScriptLibrary import all the scripts from any given stack. ScriptLibrary's Import function allows you to specify whether you want to import all the scripts of the stack or select only the background, foreground, button, card, or field scripts. After you import the scripts, you name them in the ScriptLibrary window.

ScriptLibrary also gives you two ways to reuse the saved scripts. When you are working in a stack, ScriptLibrary enables you to use the Shift-Option-Enter combination to get a dialog box listing all saved scripts by name. Then when you select the script, it is automatically copied into the Clipboard, ready for you to paste into a stack.

Alternatively, if you are in the ScriptLibrary you can find the script you want using HyperCard's Find function. Once the script is on screen, you can select the Copy/Paste button to place the script into a card, field, or button.

Most HyperCard developers keep their scripts scattered in stacks, stack fragments, and disorganized collections of cards. To locate an old script is often like hunting for a small piece of wire in a carton of discarded hardware. After spending several minutes searching, many programmers give up and rewrite the script. It does take a bit of discipline to use ScriptLibrary, but it will save you from hours of redundant work. ■

See Where to Buy or circle 767 (Flower), 790 (HyperOne), 782 (Hard Disk Deadbolt), or 869 (ScriptLibrary) on reader service card.



Using ScriptLibrary
The Script Author in the Script Information card automatically contains the HyperCard user name that was in effect when the script was placed in ScriptLibrary. The Date Created, Date Modified, and Handler Name are also placed automatically. You toggle between views by using the License To, Where Used, and Notes buttons in the Notes field. The Global button allows you to change the author's name, sort the library, or find a script. Speed Read lets you flip through the cards.

Read this, and paying for a new computer won't sound so great.

No one wants to pay for bells and whistles they don't need. But that's what most people do when they buy a new computer.

The vast majority don't need the latest technology—even for business. But they pay for it anyway. And end up with a bunch of high-priced extras that are unnecessary, such as music-making and color enhancements.

The truth is, the basic technology behind computers hasn't changed much since the PC and Macintosh were introduced several years ago. And the basic things people need computers for—communications, word processing, accounting—haven't changed much either. What's changed is the price.

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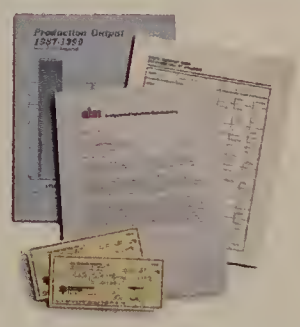

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Mac Plus Entry System

This affordable Mac Plus system includes 1 megabyte of memory, 1 internal 800K disk drive, 1 SystemGate 800K external disk drive and all of the listed items.*

Sugg. List $2135 **CDA $1499**
Delivery Charge $58 Package #8980

With a 30 meg hard drive instead of the SystemGate 800K drive...**CDA $1899**
Delivery Charge $70 Package #8981

Mac SE/30 HD40 System

This compact yet powerful SE/30 system includes Apple's 40 meg hard disk, the 1.44 meg disk drive, 1 meg of memory, and all of the listed items.*

Sugg. List $5356 **CDA $3749**
Delivery Charge $94 Package #8984

Mac SE/30 HD 80/4 System

This high capacity storage system includes Apple's 80 meg hard disk, the 1.44 meg disk drive, 4 megs of memory and all of the listed items.*

Sugg. List $6755 **CDA $4999**
Delivery Charge $102 Package #8985

Mac IIcx/40 Color System

This system includes Apple's 40 meg Hard Drive, the 1.44 meg disk drive, 1 meg of memory, the extended keyboard, Apple's Hi-Res Color Monitor w/video card and all of the listed items.*

Sugg. List $6981 **CDA $5295**
Delivery Charge $131 Package #8986

With Apple's 80 meg hard drive and 4 megs of memory .....**CDA $6599**
Delivery Charge $138 Package #8987

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Choose one of the printer packages below that will best suit your needs.

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- Extra ImageWriter Ribbon
- Printer Dust Cover
- Package of Computer Paper

Sugg. List $633 **CDA $475**
Delivery $39 Package #8940

GCC Personal Laser Plus

- GCC Personal Laser Plus
- SCSI Cable and SCSI Terminator
- Extra Toner Cartridge
- Laser Printer Dust Cover
- Package of Laser Paper

Sugg. List $2394 **CDA $1749**
Delivery $69 Package #8941

LaserWriter IINT Package

- LaserWriter IINT Printer
- Two LocalTalk cables
- Extra Toner Cartridge
- LaserWriter Dust Cover
- Package of Laser Paper

Sugg. List $5274 **CDA $3795**
Delivery $99 Package #8942

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Apple Hardware

Macintosh Plus	$1329
Macintosh SE 2 Dr. w/Keybd	$2329
Mac SE HD20 Meg w/Keybd	$2749
Macintosh SE HD40/2MB w/Keyboard	$3169
Macintosh SE 30 HD40 w/ Keyboard	$3749
Macintosh SE 30 HD80/4MB w/Keyboard	$4999
Macintosh IIcx HD40 w/ Extended Keyboard	$4195
Macintosh IIcx HD80/4MB w/ Extended Keyboard	$5495
Macintosh IIx HD80/4MB w/ Extended Keyboard	$5895

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(prices include required cables)

Olympia NP-30APL	$289
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ImageWriter II Sheet Feeder	$189
LaserWriter IINT	$3695
LaserWriter IINTX	$5295
Apple Toner Cartridges	$ 109
HP DeskWriter	$995
GCC WriteImpact	$549
GCC Personal Laser Plus	$1699
GCC Business Laser	$3349

Monitors

Apple Hi-Res Color	$799
Apple 4 Bit Video Card	$399
Apple 8 Bit Video Card	$519
Apple Portrait Display	$829
Apple Portrait Video Card	$479
Apple Two Page Display	$1599
Apple 2 Page Video Card	$479
Radius Full Page	$719
Radius Full Page Interface Card	$479

Drives

Apple 3.5 Disk Drive	$349
Apple 3.5 800K Internal (Mac II) *(Limited Supply)*	$99
SystemGate External 800K	$149

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CMS MacStack 60 (40ms)	$739
CMS MacStack 80 (28ms)	$859
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CMS Platinum 65 (32ms)	$959
CMS Platinum 80 (18ms)	$1399
CMS 45 Megabyte Removable	$999
EMAC 20D (65ms)	$469
EMAC 20 Impact (40ms)	$519
EMAC 40 Impact (28ms)	$629
EMAC 60 Tape Backup	$649

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DataDesk 101 ADB Keyboard	$137
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Apple Flatbed Scanner	$1349
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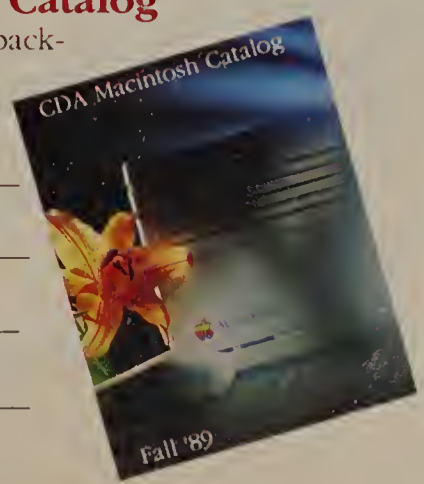

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Circle 152 on reader service card

NEW PRODUCTS

Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

ClearVue/SE

Monochrome display system comprising a graphics board that plugs into the Mac/SE and a 19-inch monochrome monitor. Built-in CPU accelerator increases the CPU processing speed from 8MHz to 16MHz. $1995. RasterOps, 408/562-4200.

Cobra Hard Disk Drives

Series of internal and external 3½-inch hard disks available in capacities of 45MB, 70MB, 100MB, and 215MB. $1399 to $2549. Rodime, 407/994-5585.

Cobra Hard Disk Drives

DataCase Line of Hard Disks

Series of five external hard disks with software. Hard disks are housed in DataCase subsystem, which includes flow-through ventilation system, 50-pin SCSI interface connector, dial-up SCSI ID selector, switchable power supply. Cables included. $780 to $1330. Heart Data, 818/998-1691.

Ehman 44MB Removable

Removable 44MB disk drive with SyQuest drive mechanism and average access speed of 25 milliseconds. Does transparent automatic error detection/correction. $849. Ehman, 307/789-3830.

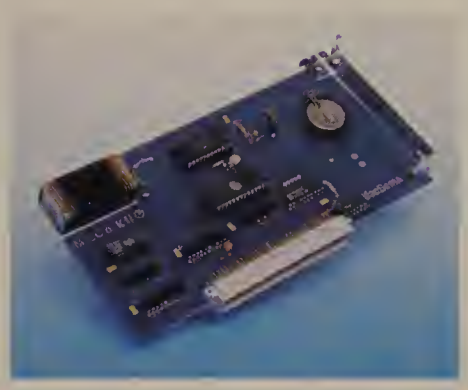
Gigapack Mac

Gigapack Mac

Tape storage system that stores 1.2GB of data on 4mm backup tape cassette. Average file-access time is approximately 20 seconds. Has pulldown menus. $5950. GigaTrend, 619/931-9122.

Gray-Scale Display Adapter

Gray-scale display adapter that gives Apple's 21-inch monochrome monitor the ability to display graphic images in 256 shades of gray. Compatible with Apple's interface guidelines. $1899. Sigma Designs, 415/770-0100.



MacClock II

MacClock II

NuBus board with an application that can start and stop applications remotely. Lets you set one alarm or several that can be used to invoke a macro to start and control any application. $199.95. MacSema, 503/757-1520.

MacRing

Token ring board for the Mac/SE. Provides three levels of software functionality: AppleTalk over token ring providing Mac-to-Mac connectivity over token rings; compatibility with Novell netware version 2.1.5 allowing users to make a PC a file server and share files with Macs on a token ring LAN; and 3270 Mac-to-mainframe connectivity over token ring. $795. h-three Systems, 919/549-8334.

MaynStream Tape Backup System

Three models of Macintosh-compatible tape backup systems that store 60MB, 150MB, and 2.2GB of data. Statistical display gives data regarding backup, restore, and verification. Advanced file selection lets you designate specific files for backup. 60MB $1595, 150MB $1895, 2.2GB $7495. Maynard Electronics, 407/263-3500.

NuBus BusTrak

Bus analyzer that works in any system using NuBus architecture. Captures up to 32,000 bus states. Plugs into any NuBus expansion slot and samples data at 10MHz. $2495. Applied Physics, 317/497-1718.

Radius Full Page Display Interface for the SE/30

Full-page display system for the Mac SE/30; consists of Radius FPD-SE/30 Video Interface and Full Page Display monitor. Monitor is 15-inch diagonal with low-curvature screen. $895. Radius, 408/434-1010.

Sampo Mac Monitors

Sampo Mac Monitors

Series of five monitors that are compatible with the entire Macintosh line. Series

(continues)

includes one monochrome, one black-and-white, and three color monitors. $1494 to $4490. Sampo, 404/449-6220.

SC-7500 Color Scanner

SC-7500 Color Scanner

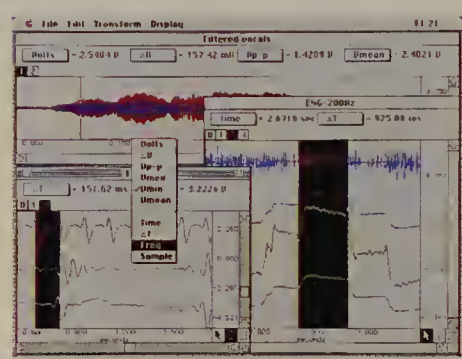
Color image scanner with fixed flatbed scan system. Produces up to 400-dpi resolution from reflective art and color transparencies up to 11 by 17 inches, and supports all hardware. $8950. Cooper-Cameron, 201/338-1001.

Sierra Drive

New series of nine portable, vertically standing hard disks. Capacities range from 20MB to 132MB. Units are small enough to fit inside a briefcase and require external power supply only for Macintosh Plus. $790 to $2490. Relax Technologies, 415/471-6112.

TelePacq

Portable data-acquisition system designed to collect and process data via standard telephone lines. Does remote data acquisition over extended periods of time. Data can be viewed in real-time and stored to disk. Comes bundled with data-acquisition control module, modem, and software. Requires Mac 512K. $1995. Biopac Systems, 805/967-6615.



TelePacq

TravelPak Hard Disks

Removable external hard disks that come in 40MB, 80MB, and 100MB capacities. 40MB $929, 80MB $1379, 100MB $1499. Astro Systems, 408/727-5599.

ViewFrame II+2

Updated version of original ViewFrame LCD projection panel. Adds double-scanning circuitry and composite input jack that works with DEC VT 220 and Apple II series of computers. $1995. nView, 804/873-1354.

SOFTWARE

After Dark

Screen saver package that lets you choose from such images as streaking meteors, raindrops, lightning bolts, crawling worms, and company logos. Includes anti-snoop feature to prevent unauthorized persons from awakening a screen without a password. 512KE min. memory. $39.95. Berkeley Systems, 415/540-5535.

Arthur: The Quest for Excalibur

Game based on Arthurian legend. Players develop the kingly qualities of wisdom and chivalry to regain the sword stolen by the evil King Lot. 512K min. memory. $39.95. Mediagenic/Infocom, 415/329-0800.

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CanOpener
Information-retrieval utility for the Mac that lets users open most Mac files and search the contents for text, pictures, and sounds. Information can be viewed or extracted for use in other applications. 512K min. memory. $125. Abbott Systems, 914/747-3116.

Color Separation Module-TIFF
Software that produces four-color separations from 24-bit TIFF files and provides the user with control over undercolor removal, color correction, gray-scale balancing, black generation for contrast control, dot shape, screen angle, and frequency. Produces output for PostScript image setters. 1MB min. memory. $495. Pipeline Associates, 201/731-7860.

E-School Fonts
Set of two bitmapped fonts for creating classroom materials in elementary schools using the ImageWriter. Michelle font has cursive characters, and GradeOne font has block letters. Set has special characters for guidelines, math symbols, and practice forms. 1MB min. memory. $25. Sands-Kidner Associates, 408/426-4417.

Facts & Faces of Hollywood Greats
HyperCard-based quiz about Hollywood's movies and stars. Contains more than 500 questions asked in a random order without repeating those previously answered correctly. 1MB min. memory. $49.50 plus s/h. Visatex, 408/866-6562, 800/722-3729.

Fitness Bodies and Aerobic Exercises
Health, physical fitness, and aerobic exercise clip art. Comes in black on white or white on black HyperCard and MacPaint formats. 1MB min. memory. $39.95. The Best Choice, 800/358-2984, 800/553-2188 in California.

FlexiGraphs
Software made up of drawing tools for creating a graph that can be used as an input device for pasting numbers into any spreadsheet program. 512KE min. memory. $149. For Your Information, 805/733-2990.

Golf Statkeeper
Program tracks a golfer's performance in areas such as driving accuracy, greens in regulation, putting, chip- and trap-save percentages, and birdie conversions. Stores statistics for up to eight golfers on 24 courses. 512K

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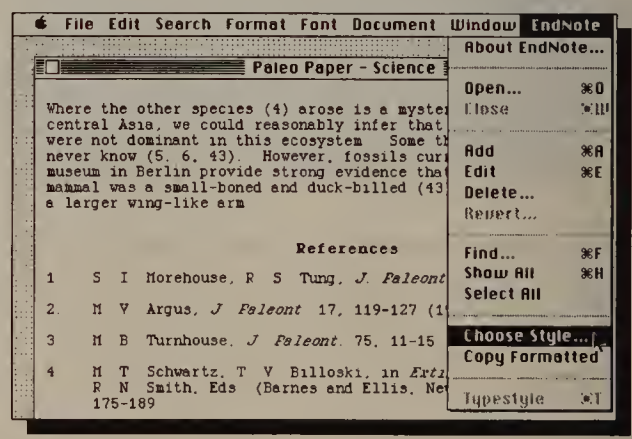

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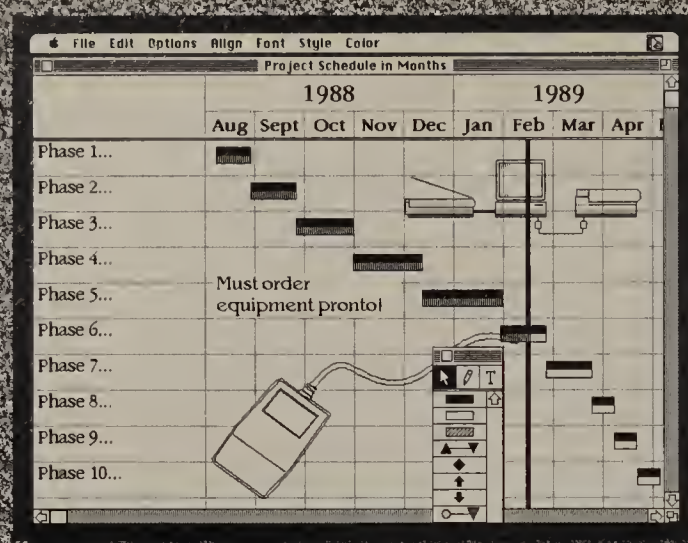

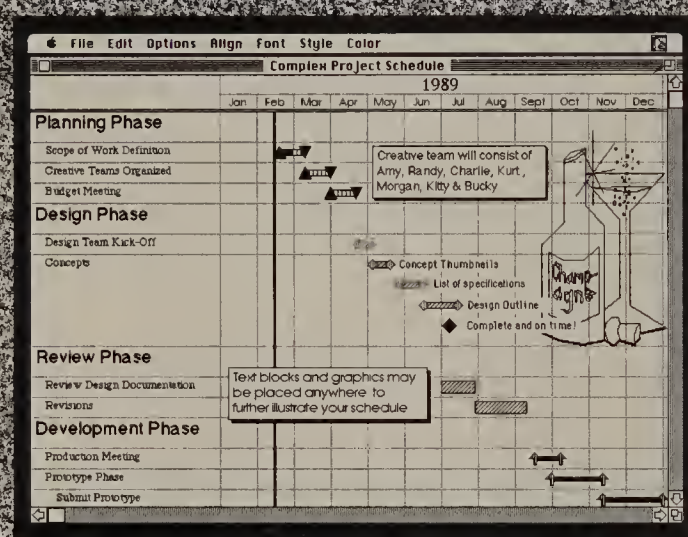

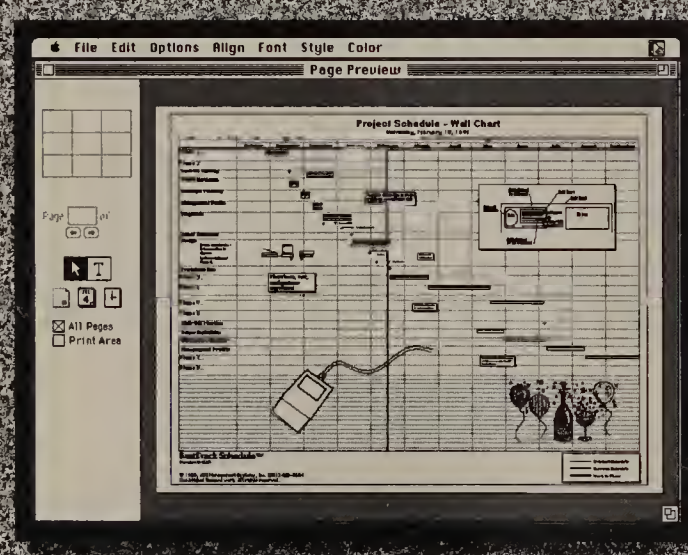

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min. memory. $49.95. 1 Step Software, 800/669-1555.

Hydro Mac

Rational hydrographics program for civil engineers to use in designing detention ponds. 1MB min. memory. $395. Applications Design Group, 201/285-5160.

Keep in Touch

HyperCard-based correspondence software that helps users to create customized letters and greeting cards. Contains a database in which to store information about friends' birthdays, anniversaries, special holidays, and news, which can then be used to compile letters. 1MB min. memory. $30. Howard Henry Software, 801/277-7851.

MacDendro

Tree-ring measurement system used by foresters to evaluate tree growth, measure effects of insect-borne diseases, quantify the decline of maples, study climatology and dendrochronology. Uses image processing to automatically find rings and emphasize their contrast. Requires Mac II, IIx, or IIcx and high-resolution scanner. 2MB min. memory. Without scanner $9999, with scanner $18,518. National Optics Institute, 418/657-7006.

MacRaf

Mac-to-VAX integration software that lets Mac users access a remote VAX without using remote computer commands. Provides seamless file service, print service, automatic log-on capabilities, and file-transfer speeds of up to 120,000 bytes per second. Works with Mac/SEs and Mac IIs. 1MB min. memory. $295 per Mac for the Mac side; $395 per Mac user per VAX host for VAX side. Datability, 800/342-5377.

Mahogany Introductory

Expert-system development tool for the Mac that uses an IF-THEN rule format, has optional ELSE and UNKNOWN clauses in rules, and supports knowledge bases with several hundred rules. Rules may contain more than 50 clauses. 1MB min. memory. $149. Emerald Intelligence, 313/663-8757.

Mahogany Introductory

Math Castle

Mathematics game for ages 3 and up in which you defend your castle by answering math problems correctly. Stresses addition, subtraction, multiplication, and division, and contains more than 6000 preset math problems with 40 levels of difficulty. $34.95. Envision Software, 206/874-4044.

Monster Fonts

Ten-disk collection of Macintosh ImageWriter and LaserWriter fonts. All fonts are in the public domain. Proceeds go toward the fund-raising efforts of the Mug News Service's MacUser Grant. 512K min. memory. $49.95. Showker Graphic Arts & Design, 703/433-1527.

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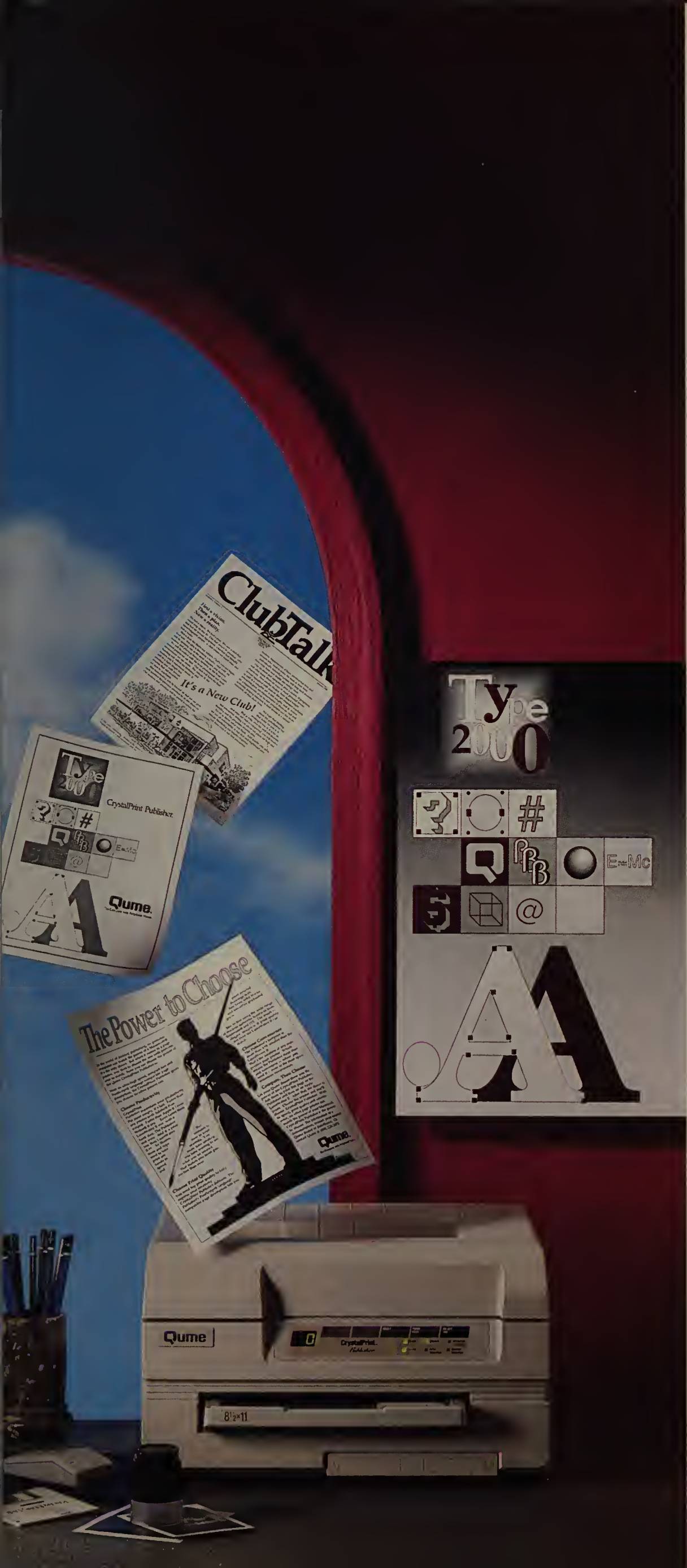

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Cabinet becomes platform for LaserWriter. Holds disks, manuals, and a full carton of paper.

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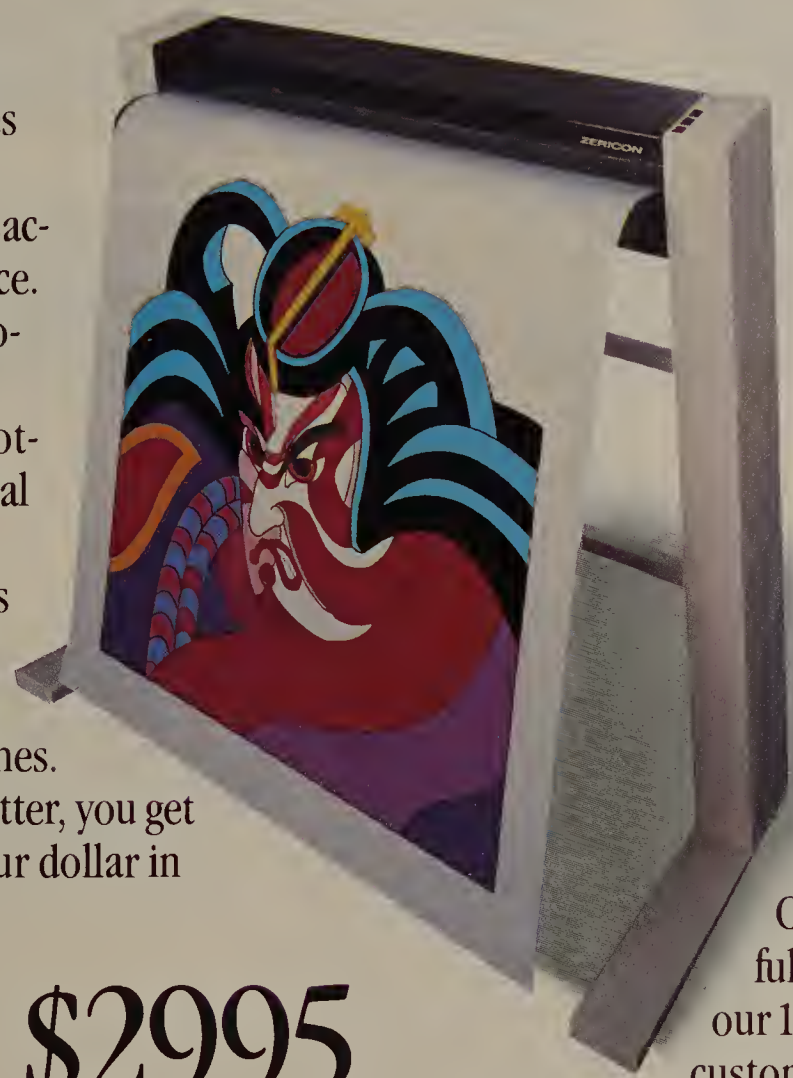

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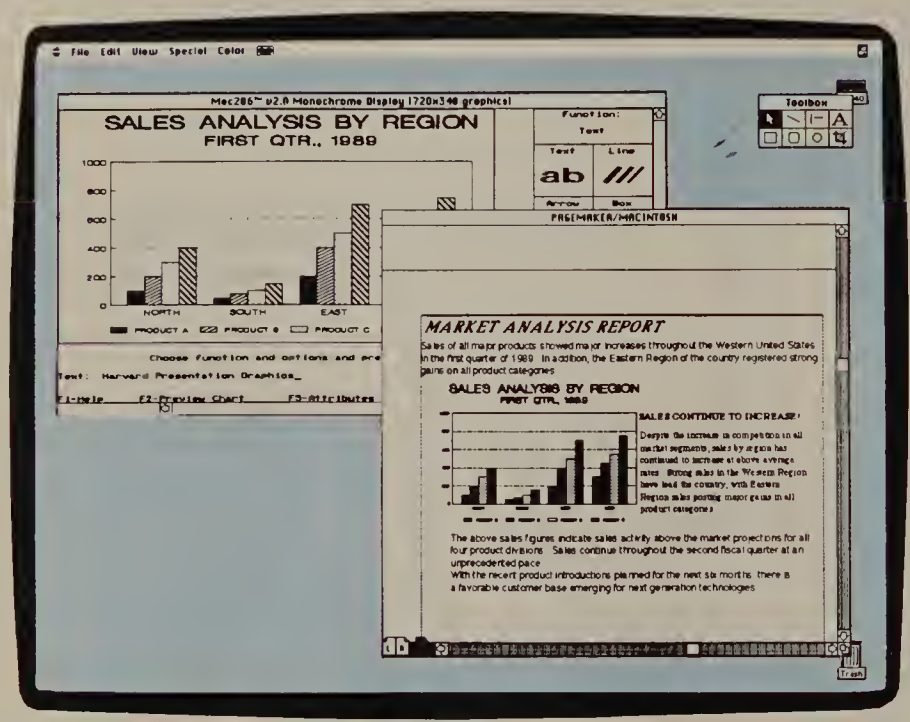

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Movies, Movies, Movies
HyperCard guide to more than 2000 motion pictures released from 1918 through 1988. Stack gives information about title, cast, director, plot, type of movie, year released, and other information. Includes print command. 1MB min. memory. $35. MacKay Associates, 402/466-6665, 800/458-3463.

Name That Chord
Desk accessory text font that supplies chord names for use with Mac music notation applications or word processors. Lets music writers transpose chord name symbols. Available with options for writing and transposing for laser printing, bitmap printing, and a combination of all options listed. 512K min. memory. $39.50 to $59.50 depending on options. Note Ware, 213/822-1300.

NetStream
Software that performs unattended network backup for AppleTalk networks. Backup times may be scheduled in advance. Backs up all servers and nodes on the network to a single device. Compatible with AppleShare, TOPS, and Multifinder. 512KE min. memory. Administrative package of five nodes $495; each additional node $89; site license available. Personal Computer Peripherals, 813/884-3092, 800/622-2888.

The New Electronic Encyclopedia
Macintosh CD ROM version of the 21-volume New Electronic Encyclopedia originally released for the PC. Contains more than 3000 updated or new entries. Electronic bookmark saves the user's place. $395. Grolier Electronic Publishing, 203/797-3500.

Omnis 5
Applications generator that provides color, multiple fonts, multiple windows, variable-length fields, and simultaneous data access across Macintosh- and IBM-compatible formats. 1MB min. memory. Single-user version $695; for each additional user $145. Blyth Software, 415/571-0222.

OutSpoken
Software for the blind. Uses Macintalk to enable users to navigate around the Mac screen with tonal and simulated clues. Comes with printed and tone-indexed cassette manual, braille quick-reference card, and embossed representations of the Mac screen. 1MB min. memory. $395. Berkeley Systems, 415/540-5535.

Pediatric Telephone Protocols
Software tool to assist health care professionals who give phone advice for children's medical problems. User can modify the supplied protocols to conform to individual practice and create new protocols to deal with additional complaints. 1MB min. memory. $199. Health-Tek Medical Software, 303/420-7438.

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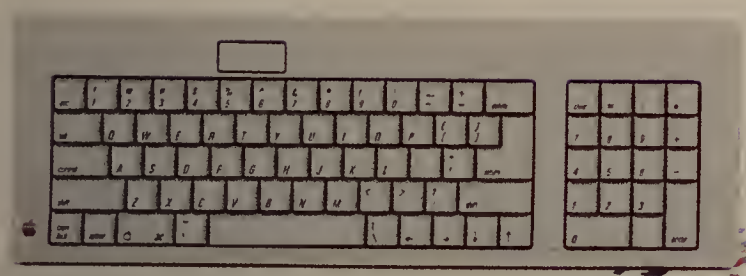

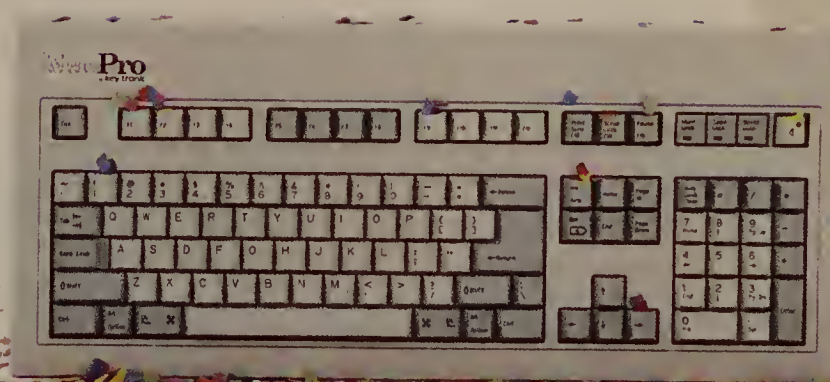

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The Phrase Thesaurus Report Pad

HyperCard stack designed as a writing tool. Provides phrases to help students develop ideas in writing. Contains a help section. 1MB min. memory. Site license $249, individual copy $69. Intelligence Active/Research Design Associates, 800/344-0571.

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use of hardware applications such as bar code readers, printers, and light pens with inventory-software capability. 1MB min. memory. $3995 multiuser version, $2495 single user. AnaMatrix, 801/546-1616.

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Wizard Link Mac

Software and cables to connect Sharp Electronics hand-held computer Wizard to the Mac. Includes programs for data transfer and conversion, calendars, schedules, time accounting, phone lists, and to-do lists. 512K min. memory. $149.95. Wizard Link Mac, 206/483-8088.

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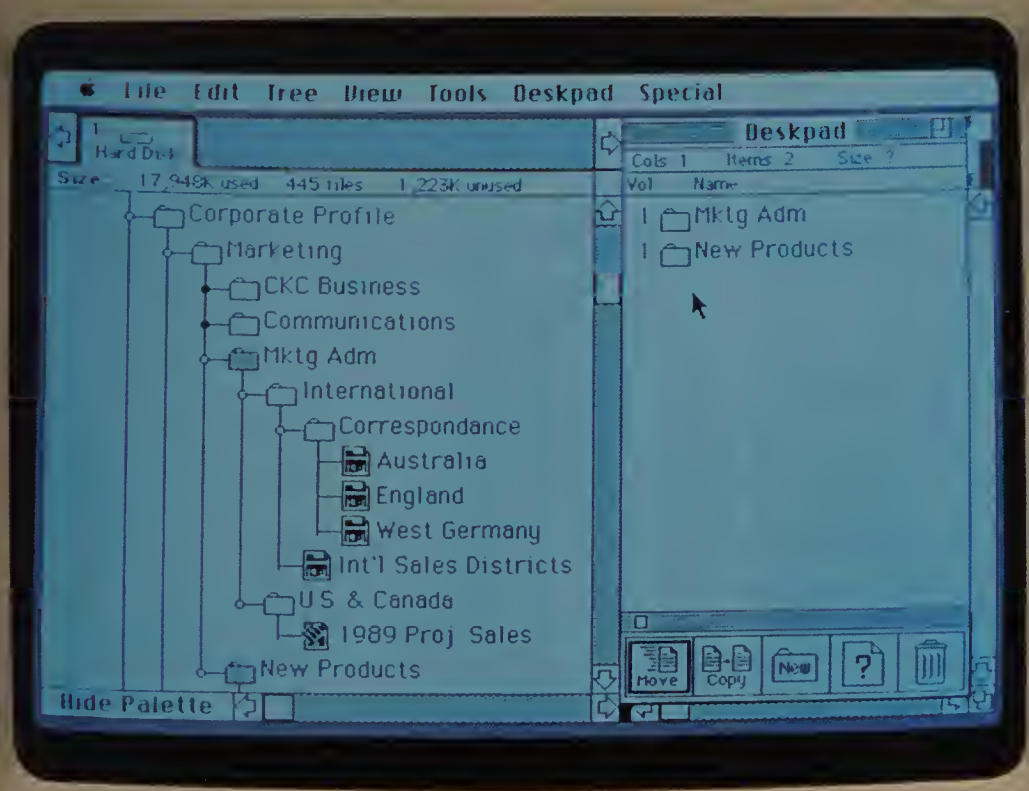

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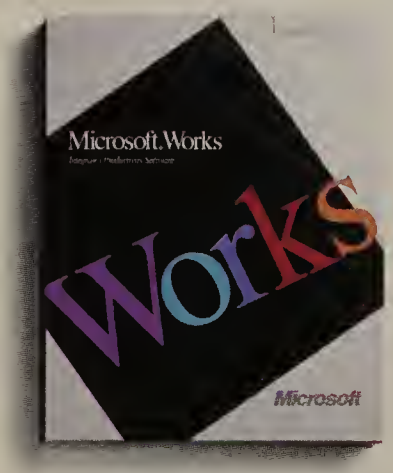

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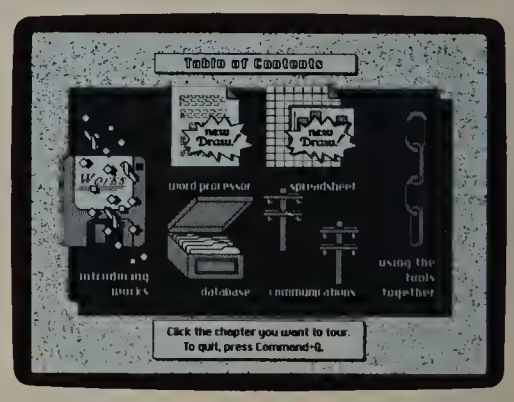

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HOME FRONT

MARTIN REALTY

Real Estate News for the Greater Aspen Community - Published by Martin Realty

Lowest Lending Rates Since 1983!

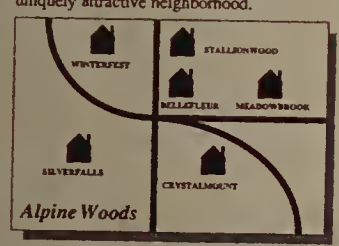
Last week mortgage interest rates reached a five-year all-time low. First Mortgage offered a 30-year, 95 percent new home loan at 8.5 percent with no points. Unheard of in recent years.

Resale of homes has jumped 13 percent over sales recorded during the same period last year.

New Home sales are up 17 percent. Several local lenders have put together special new home financing packages in cooperation with local contractors. Call our Aspen office at (426) 838-2961 for details.

Crown Construction Opens This Year's Alpine Woods Development

The Alpine Woods development will be open for public tours from July 15 until August 21. Each home represents a distinct style from contemporary to French provincial – all homogeneously placed to create a uniquely attractive neighborhood.



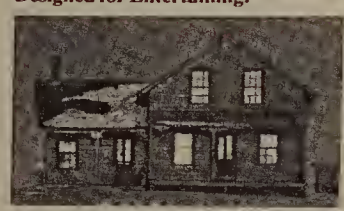
Each home has been fully decorated by a local interior design firm and each is singu-

just shopping for ideas, we recommend this year's Alpine Woods development.

You can park at the Denny Shopping Center and take a tour bus from there between 9:00 a.m. and 6:00 p.m. daily.

HOME OF THE MONTH

Lakefront Country House: Designed for Entertaining!



This lovely brick and cedar country house can be found just fifteen-minutes from downtown Aspen. Nestled in giant firs, it represents true Colorado style!

The master bedroom suite features a panoramic view of Lake Diamond. The master suite also has his-and-hers walk-in closets, a separate vanity, and a stunning shower area made of glass bricks.

The living room, study, family room, and bedrooms (2+) feature hand-polished redwood panelling and skylights.

The three-car garage has special wall-mounted ski racks and an extra-sized third stall to accommodate up to a 24-foot boat.

Two additional baths, a stone fireplace, 800 square feet of decking, three wooded acres, and a private dock complete this rural dream home.

MARTIN REALTY

July 28, 1988

Gary and Lisa Elliot
533 4th Street
Denver, CO 54556

Dear Gary and Lisa,

This Saturday, I look forward to showing you a few of the quality homes in the Aspen community.

Per our phone conversations, we will be looking at family homes with a minimum of four bedrooms, two-and-a-half baths, a family room, and a three-car garage. It sounds like you are a pretty active family, so I've also chosen homes with a "mud room" for changing wet boots, etc.

One issue that we haven't realty discussed is schools. Before Saturday, you might want to jot down a few priorities. Public, private, parochial? Level needed--from pre-school to college. And any special needs your children may have, like proximity to an indoor pool or gym.

I can also put you in touch with any youth organizations you may be interested in like The Boy Scouts or 4-H. We have it all.

You mentioned wanting a fairly good-sized lot. Does this mean that you will need stables or a barn? I can even put you in touch with a local riding stable if you wish.

Since you plan to be here for the whole weekend, let me know if I can be of any help with hotel reservations or activites. I can arrange for anything from theatre tickets to a riding lesson. Whatever might make your stay more pleasant, and leave a good impression of Aspen.

It's a beautiful place and we're happy that you've decided to make it your home.

Sincerely,

Peter Cohen
Residential Agent

cc:file

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St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

The Stefls
14 Lamplighter Lane
Ridgefield, VT 29333

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Design Place
Santa Cruz, CA 66667

COMMISSIONED SALES REPORT—JUNE

Sales Person	Type	Rate	Sales YTD	Billings	Check Amt.
Shannon Pitts	Commercial	3.80%	$275,000	$88,000	$3344.00
Lisa Doan	Residential	3.00%	$320,000	$120,000	$3600.00
Peter Cohen	Residential	3.00%	$230,000	$100,000	$3000.00
Robbie Ross	Commercial	4.00%	$500,000	$340,000	$13600.00
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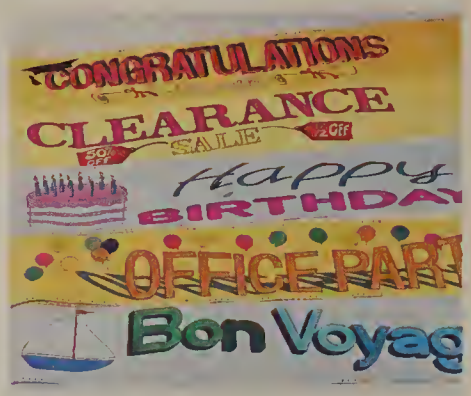

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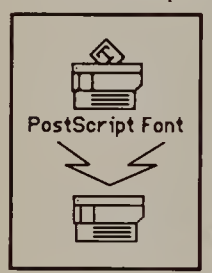

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BOOKS & VIDEOS

Inside PostScript

Book about the inner workings of PostScript written by Frank Braswell. Includes a discussion of error handling, printer control, job execution, file input/output, and other PostScript topics. $37.50. Peachpit Press, 415/527-8555.

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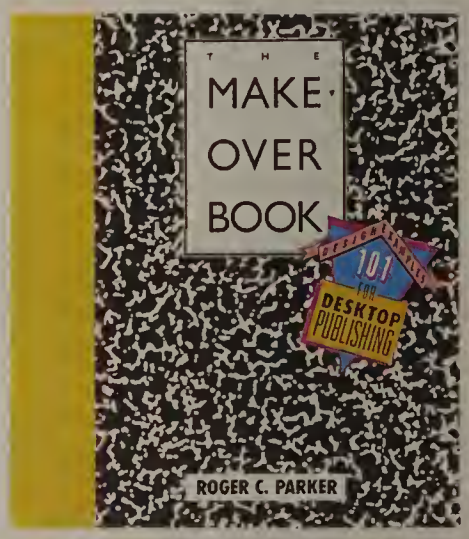
Book for beginners who want to make a profit in the mail-order business. Gives overview of mail-order process, includes charts, sample letters, and sample forms. Charts, letters, and forms included on disk. Written by Marilyn Smith Schultz. $19.95 plus $2.50 s/h. Tribute, 800/544-8191.



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Collection of before-and-after graphics ideas for DTP. Contains illustrations of tips and tricks for improving the look of newsletters, advertisements, and other publications. Gives side-by-side layout comparisons. Written by Roger C. Parker. $17.95. Ventana Press, 919/942-0220.

Speaking of Networks: A Glossary for Network Users

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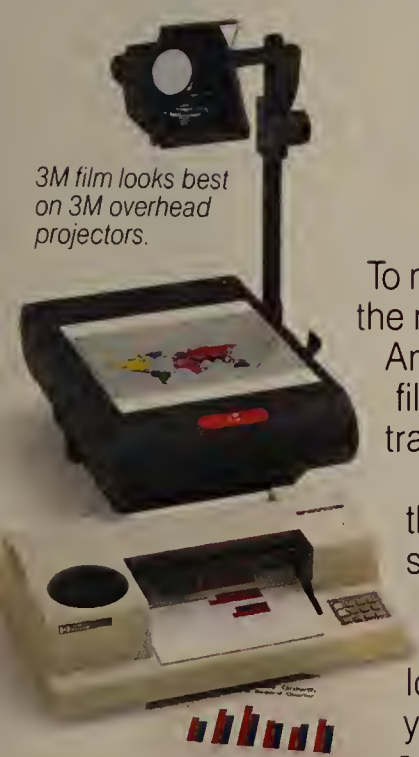

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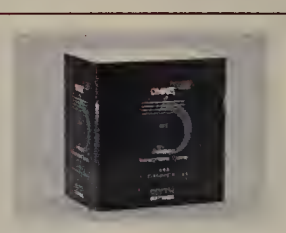

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WordPerfect 1.02 ..... 184.

Xerox (Datacopy)
AccuText ..... 745.

Zedcor tnc.
DeskPaint/DeskDraw ..... 65.
ZBasic 5.0 ..... 98.

Hardware

ACCELERATORS AND MEMORY UPGRADES

Daystar Digitat
Mac SE Accelerators
Daystar 68030 16MHz ..... 975.
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Daystar 68030 33MHz ..... 2395.
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Daystar 68030 25MHz ..... 1798.
Daystar 68030 33MHz ..... 3098.
Daystar 68030 40MHz ..... 3748.
Daystar 68030 50MHz ..... 4498.

Dove
Upgrades for 512k & 512kE
MacSnap 524 ..... 192.
MacSnap 524e ..... 185.
MacSnap 524s ..... 240.
MacSnap 548 ..... 432.
MacSnap 548e ..... 419.
MacSnap 548s ..... 479.
SCSI Port Adapter ..... 109.
Marathon 020 SE Accelerators
MSE1 (Board Only) ..... 429.
MSE2 (...w/1 Mb) ..... 715.
MSE3 (...w/68881 chip) .... 645.
MSE4 (...w/68881 & 1mb) ..... 899.
Marathon 030 Accelerators
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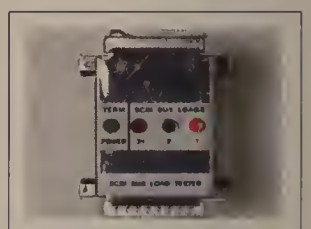
32MHz - Mac IIx ..... 975.
32MHz - SE/30 ..... 995.

Irwin
Excelerator XL 20 MHz ..... 748.
Excelerator XL 25 MHz .... 1280.

Macintosh
1 Megabyte SIMMs ..... Call
256k SIMMs ..... Call

Motorola - Math Co-Proc.
68882 - 16MHz ..... 289.
68882 - 25MHz ..... 425.
68882 - 33MHz ..... 695.
68882 - 40MHz ..... 748.

Orchid Technology
Mac Sprint II, Cache Card ..... 249.



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Best Data
Smart One 2400 Baud ..... 145.
...w/Red Ryder ..... 179.

Everex
EMAC Md2400 Baud ..... 198.

tncomm
Turbo 9600 V.32 ..... 635.
Turbo 9600 Internal ..... 845.

MacTech
SmartLink 2400 ..... CALL
SmartLink 2400M ..... CALL

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Shiva Corporation
NetModem V2400 ..... 439.

Supra Corp.
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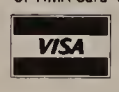

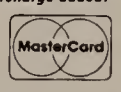

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U.S. Robotics
9600 HST Baud Modem .... 685.

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Abaton
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Scanner 300/S (4 Bit) ..... 1198.

Logitech
Scan Man ..... 339.

RasterDps
TrueCapture 324 ..... 1995.
TrueCapture 324 with Video Option ..... 2398.

Sharp
JX 300 Color Scanner ..... 3995.
JX 450 Color Scanner ..... 5995.

Thunderware
Lightning Scan ..... 405.
ThunderScan 5.0 ..... 187.

Xerox - Datacopy Scanner
Datacopy 730GS ..... 1498.

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Flipper 150 Tape Backup ... 995.
Integra 20 External ..... 435.
Integra 30 External ..... 515.
Integra 45 External ..... 595.
Integra 60 External ..... 689.
Integra 80 External ..... 749.
Integra 100 External ..... 985.
Integra 170 External ..... 1695.
Sonar 600 Mb Read-Write Optical Disk Drive ..... 4995.

Dolphin (Speed Drive Line)
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Integra 80 Q External ..... 1045.
Integra 105 Q External ..... 1178.

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EMAC Impact 40 Plus ..... 755.
EMAC 60/60dtl Deluxe ..... 1495.
EMAC Impact 80 ..... 1095.
EMAC 60t (Tape Backup) ..... 698.
EMAC Impact 150 Meg (Tape Backup) ..... 1199.

NEC
CD ROM Drive ..... 845.

Dsicom Technologies
MacBest 20ext ..... 439.
MacBest 30ext ..... 525.
MacBest 40ext ..... 589.
MacBest 60ext ..... 685.
MacBest 80ext ..... 695.
MacBest 170ext ..... 1695.

PLI (Peripheral Land, Inc.)
Infinity 44 Removable ..... 1135.
Infinity 44/44 Twin Removable Drive ..... 2195.

Syquest
44 Meg Cartridges ..... 109.

HARD DISKS - INTERNAL

CDC
CDC 135 Mb ..... 1795.
CDC 172 Mb ..... 1995.

Connor
Zone 100 ..... 859.

Dolphin
Dolphin 80-IIcx Internal ..... 735.

Micropolis
150 Meg ..... 1250.

Osicom Technologies
MacBest 30ise ..... 425.
MacBest 45ise ..... 439.
MacBest 60 Int. Mac II ..... 555.
MacBest 80 Int. Mac II ..... 625.
MacBest 150 Int. Mac II .. 1398.
MacBest 170 Int.I ..... 1595.
MacBest 300 Int. Mac II .. 1969.
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LT 200 PC ..... 179.

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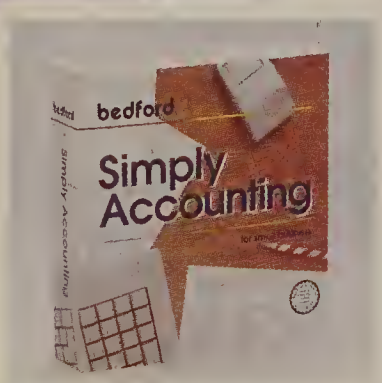

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EtherPort SE/30 ..... 469.
Fast Path ..... 1845.

Nuvotech
Turbo Bridge ..... 345.
TurboNet - DB-9 or DIN-8 ..... 21.
Turbo Net ST - OB-9 or OIN-8 .... 29.

National Semiconductor
Maccelerate A/UX ..... 469.

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NetSerial ..... 289.
TeleBridge ..... 348.

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TOPS Repeater ..... 128.
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ColorBoard 108+ ..... 1249.
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RasterOps Trinitron 19" Color Monitor ..... 3398.

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Dayna Communications
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DF0200 (1.2Mb) ..... 605.
DF0300 (720k) ..... 605.
DF0400 (1.44Mb) ..... 685.
DaynaFile - Dual Drive
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DF0103 (360k/720k) ..... 729.
DF0104 (360k/1.44Mb) ..... 810.
DF0204 (1.2Mb/1.44Mb) ... 898.

Eastman Kodak
Extalite L-5 ..... 449.

PLI (Peripheral Land, Inc.)
TurboFloppy 1.4 ..... 325.

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World Class Leader Board ... 27.

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Flight Simulator 1.02 ..... 32.

Miles Computing
Fool's Errand ..... 31.
Harrier Strike Mission II ..... 31.
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Mindscape
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KidsTime ..... 25.
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Math Rabbit ..... 32.
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Software Toolworks
Mavis Beacon Teaches Typing ... 32.

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Typing Made Easy ..... 25.

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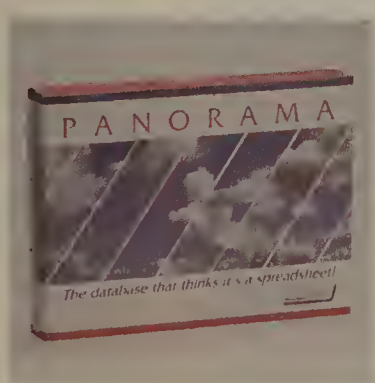

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MIDI Transport ..... 309.
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Resonate
Listen 2.1 ..... 62.

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Pro Point ADB (SE & II) ..... 79.
Addison Wesley
Inside Macintosh
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Vol. 5 ..... 23.
Inside Macintosh, X-Ref ..... 15.
Mac Prog. Secrets ..... 19.
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MouseStick ..... 69.
MouseStick (ADB) ..... 84.
American Power Conversion
UPS 110SE ..... 325.
Apple - LW Toner Cartridges
LaserWriter II Series ..... 115.
LaserWriter & LW Plus ..... 115.
Asher Engineering
Turbo Trackball ADB ..... 62.
Bantam Books
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The Complete HyperCard Handbook (2nd Ed.) ..... 22.
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800k Disk Drive ..... 155.
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IW II - Multi Colored ..... 7.
ImageWriter II - Black ..... 3.
Goldstein & Blair
Macintosh Bible ..... 19.
Katmar Designs - Disk File
Holds 45 Disks ..... 14.
Holds 90 Disks ..... 21.
Holds 135 Disks ..... 31.
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QuickStick ADB ..... 49.
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Mouse Pad ..... 6.
SCSI Tester ..... 69.
Mac Tool Kit ..... 15.
Zone Cable DB-9 or DIN-8 TeleConnector ..... 17.
Maxell
150meg Backup Tapes ..... 32.
60 Meg Backup Tape ..... 22.
Microsoft Press
Excel In Business ..... 20.
Mobius
Fanny Mac (Platinum) ..... 59.
MSC Technologies
A+ Mouse (512k & Plus) ..... 65.
A+ Mouse ADB ..... 79.
Orange Micro
Grappler C/Mac/GS ..... 78.
Grappler Mac LQ ..... 102.
Grappler Mac LS ..... 102.
Grappler Spooler ..... 38.
Sony Disks
DC 2000 40 Meg. Tape ..... 23.
Double Sided - 10 Pack ..... 14.
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High Density - 10 Pack ..... 29.
High Density - Bulk 3.25
Summagraphics
Bit Pad Plus (ADB) ..... 324.
Targus
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ImageWriter Bag Black ..... 48.
Mac/SE Bag Black ..... 56.
Williams & Macias
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Labels, 216 (LaserWriter) .... 18.
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Quick Tips

Drop-shadow labels in ReadySetGo, WriteNow style sheets, spreadsheet tabs, and more

by Lon Poole

Lots of people complain about how the LaserWriter wastes paper by printing a test page every time it's turned on. Several methods for eliminating the test page have appeared here over the last couple of years. For instance, you can send the printer PostScript commands that semipermanently turn off the test page (check the June 1987 issue for details), or you can do the same thing more easily using the Widgets utility software from CE Software (as mentioned in the February 1988 issue). A tip last June suggested you just pull out the paper tray before switching on the LaserWriter, and push it back in when the green light stops flashing. You can also conserve paper without a test ban—an idea proposed by L. W. Boyer of Houston. Just insert a piece of scrap paper in the manual-feed guide before switching on the LaserWriter. The printer automatically uses paper in the manual-feed guide instead of the paper from the cassette.

SIMPLE FRACTIONS

Q The article "Insights on Microsoft Word 4.0," which appeared in the June 1989 *Macworld*, tells how to create fractions like 36 5/8 using Word's formula-typesetting commands. When we use the sample formula from the article, however, the resulting fraction disrupts the line spacing. Are we doing something wrong?

Gail Eakins
Ottawa, Ontario, Canada

A Forget formula-typesetting commands for simple fractions. You can create simple fractions in almost any word processor by simply reducing the font size of the numerator and denominator and superscripting the numerator (see "Fraction Type"). This technique works in Word, WriteNow, FullWrite Professional, and MacWrite version 5.0 and earlier. However, the method does not work very well in MacWrite II or Microsoft Works.

NEW BEEP

Q When I use the Sound device in the Control Panel desk accessory on my Mac SE to select the Simple Beep alert sound, I get a beep like the start-up beep of a Mac SE or a Mac Plus. If I play the Simple Beep using Suitcase II, it sounds like a Mac II beep. Why doesn't the Control Panel use the Mac II beep on a Mac SE?

Steve Levitt
Los Angeles, California

A The traditional beep you dislike is produced by software built into the Mac SE and the Mac Plus. The Sound Manager software and Sound CDEV (Control Panel device) software included with System 6.0 and later versions let an SE or Plus use other alert sounds. Those other sounds may be distorted on an SE or a Plus because the Sound Manager uses a timer that's also used by some application programs. The Sound CDEV guarantees a distortion-free sound by using the built-in beep when you select Simple Beep as the alert sound.

You can use the newer, Mac II–style Simple Beep by duplicating it and renaming and renumbering the copy. You can do that with various utility programs, including Apple's ResEdit and ALSoft's FKey/Sound Mover. The shareware utility Sound Mover version 1.4 doesn't work with Simple Beep—the Mac crashes when you try to use a copy of Simple Beep.

If you're going to use ResEdit, it's much safer to work on a copy of the System file (made with the Finder's Duplicate command). Then start ResEdit and use it to open the copy. Scroll through the list of resource types until you find the 'snd ' type, and double-click to open it. From the list of specific 'snd ' resources that appears, select the one named Simple Beep and choose Duplicate from ResEdit's Edit menu. ResEdit duplicates the selected resource, assigns the duplicate a new resource number, and selects the duplicate. Now choose Get Info from ResEdit's File menu. In the information window that appears for the selected resource, change the resource name to New Beep or anything else you like. Next

(continues)

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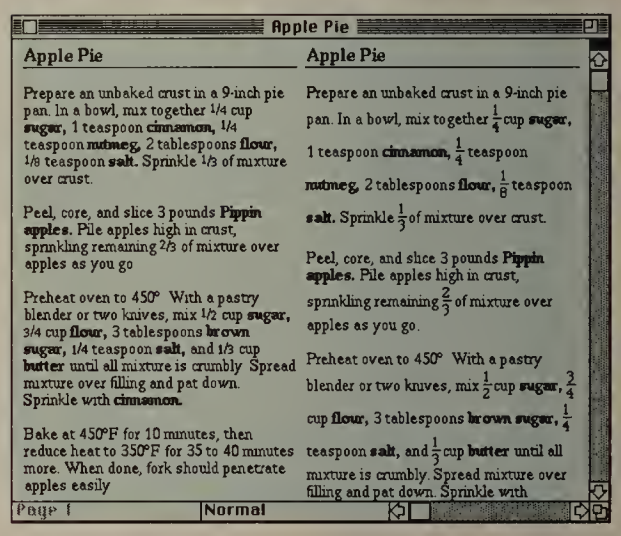
quit ResEdit, answering Yes when it asks if you want to save changes to Copy of System. Then copy the current System file to a floppy disk. If it won't fit, you can use Apple's HDBackup to copy it onto multiple floppies or use StuffIt to compress it. Then drag the System file out of the System Folder. If Copy of System is not already in the System Folder, drag it there and then rename it System. Finally, restart the Mac, use the Control Panel to change the alert beep, and drag the old System file to the trash.



Fraction Type

To create fractions like those on the left, reduce the numerator and denominator (but not the slash) by 1 to 3 points, and superscript the numerator 1 or 2 points. The amounts to use depend on the font and size of the text surrounding the fraction. In Microsoft Word 3.0 and 4.0, a typesetting formula like .\f(1,2) yields fractions like those on the right.

NEW CARD, COPY PICTURE SCRIPTS

Q In HyperCard, how can I write a script to create a new card when I reach the last card in the Address stack? How can I have that script copy a picture from an existing card and paste it on the new card?

B. L. Roberts
Houston, Texas

A The following closeCard handler in the stack script will create a new card upon leaving the last card in the stack, but only if the stack user approves.

```
on closeCard
  if the number of this card is not the number of cards
  then pass closeCard
  answer "Create a new card?" with OK or Cancel
```

(continues)

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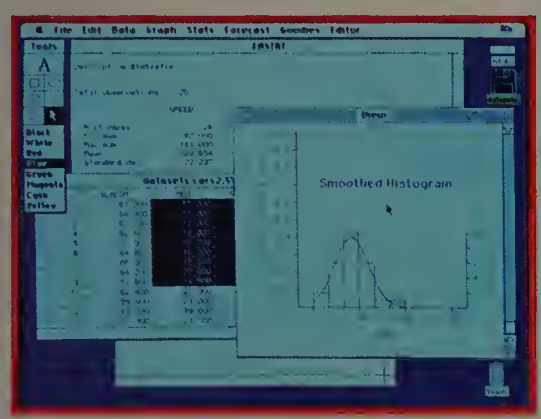

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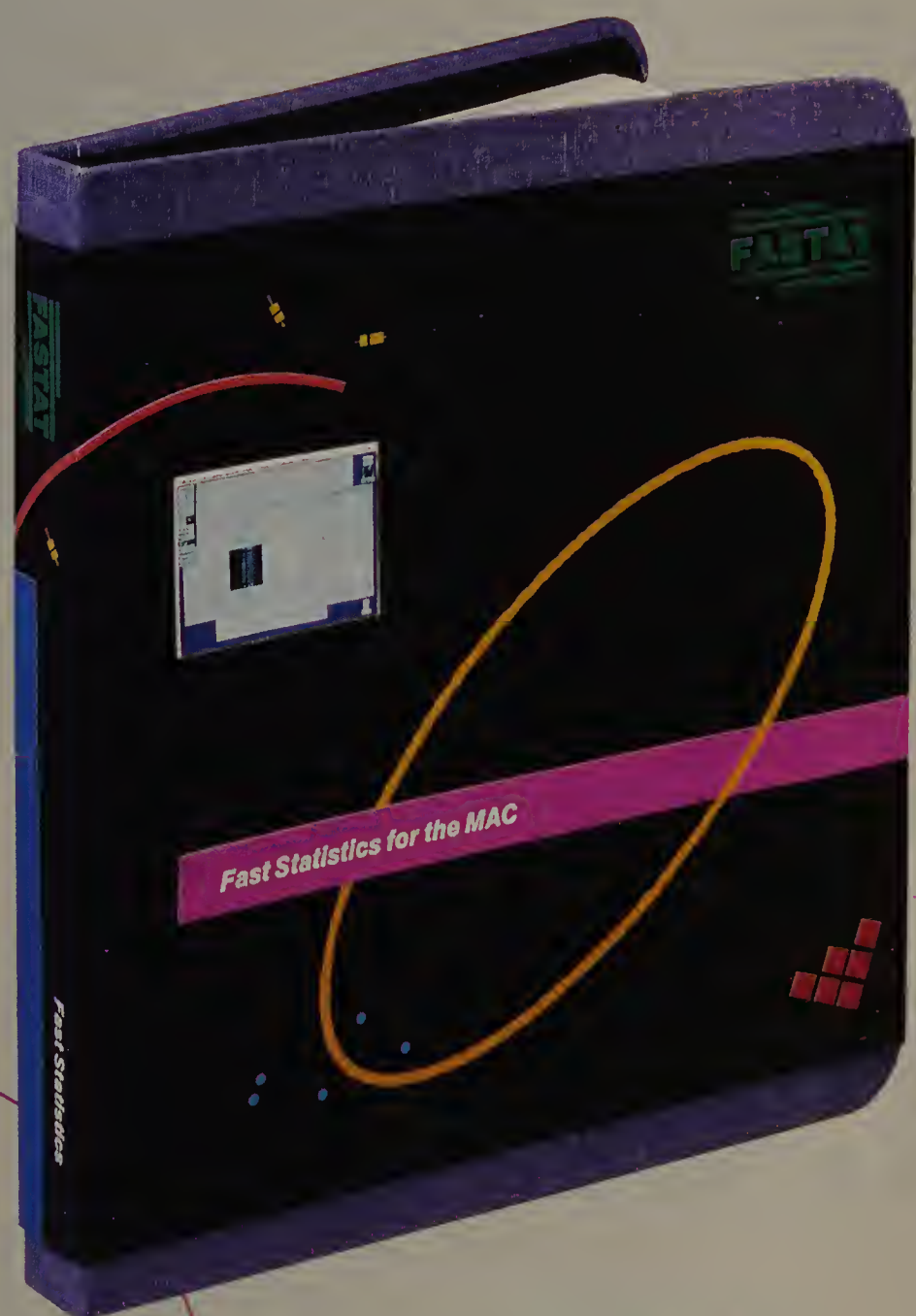

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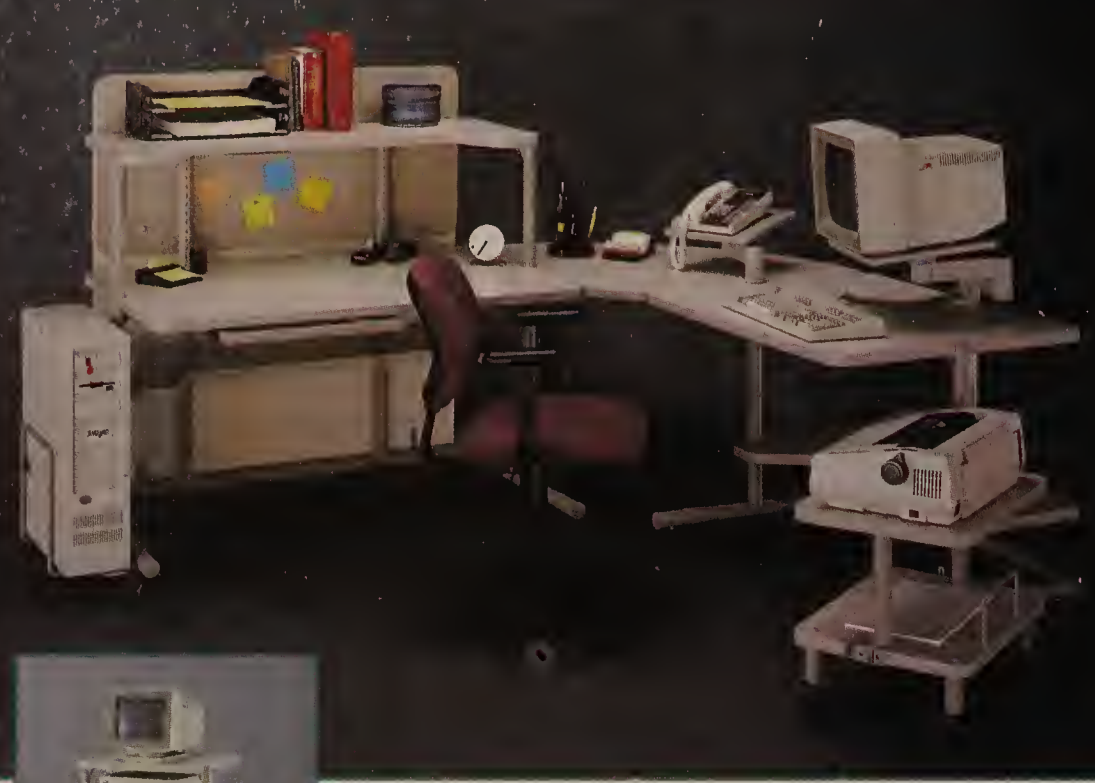

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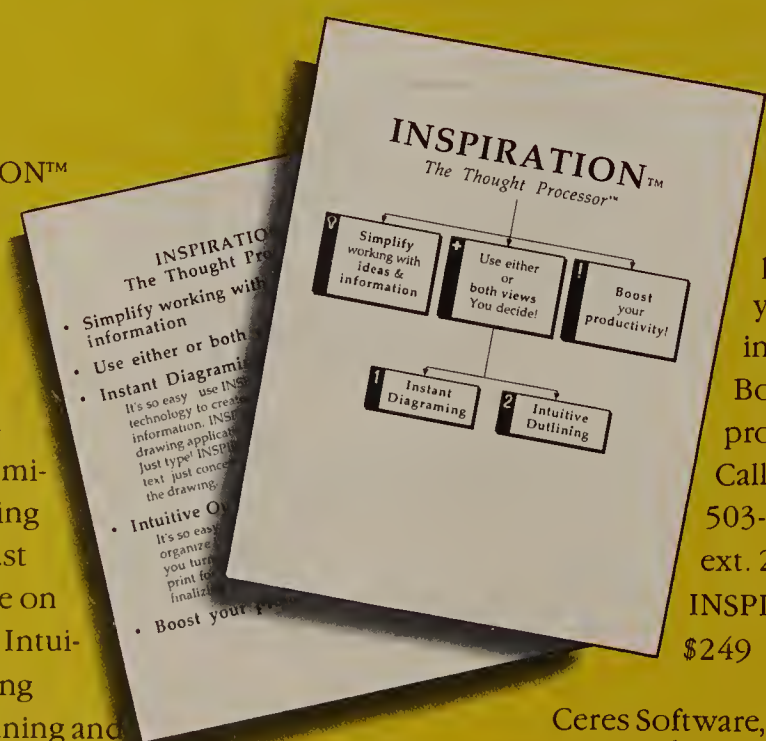

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```
  if it is "Cancel" then pass closeCard
  doMenu "New Card"

--here, use any other commands you need to
--set up the new card, such as
--copying card script, buttons, fields, and picture

  pass closeCard
end closeCard
```

Theoretically, you can copy and paste a picture with a script like this:

```
  set cursor to watch
  push card
  lock screen
  go back --to previous card
  choose select tool
  --select the whole card picture
  drag from 0,0 to 512,342
  doMenu "Copy Picture"
  pop card -- to new card
  doMenu "Paste Picture"
  doMenu "Transparent"
  choose browse tool
```

If you want the areas of the picture that aren't black to be opaque (white) instead of transparent, then omit the **doMenu "Transparent"** command.

To copy and paste a picture that has both opaque and transparent areas, you must copy and paste the entire card—picture, buttons, fields, field contents, and script. The following stack script handler does that by intercepting the New Card menu command.

```
on doMenu menuItem
   if menuItem is "New Card" then
      lock screen
      doMenu "Copy Card"
      doMenu "Paste Card"
      put empty into field "Name and Address"
      put empty into field "Phone Number"
      put the date into field "Date"
      unlock screen
      tabKey --ready to enter 1st field
  else
    pass doMenu
  end if
  end doMenu
```

Note that this handler takes over when you choose New Card from the Edit menu (or press ⌘-N) as well as when you use a **doMenu "New Card"** command. Also, it turns

(continues)

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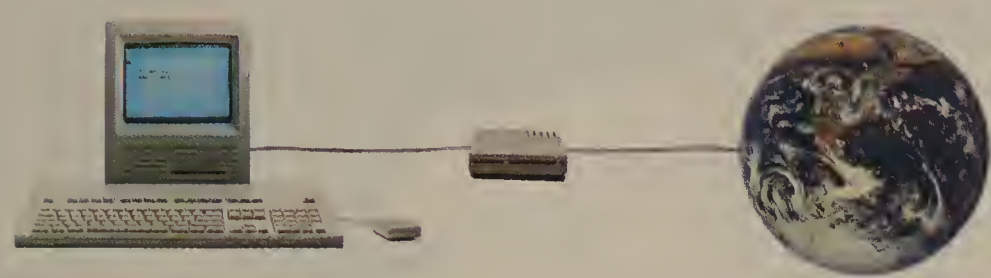

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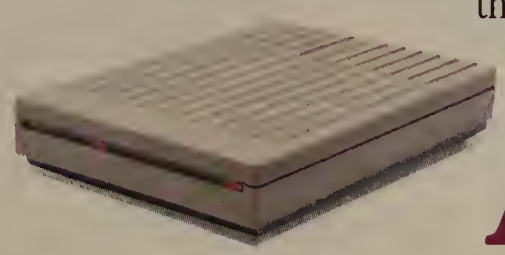

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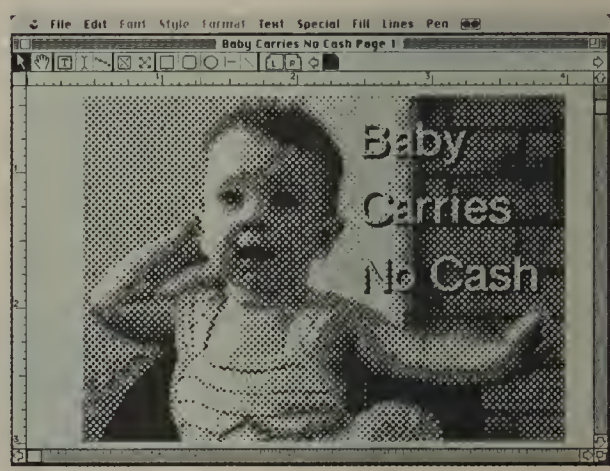
out that copying and pasting a whole card (as this script does) is faster than copying and pasting a picture (as the previous script does).



Shadow Label
For labels that stand out against a photograph or drawing, use white text with a black drop shadow.

LABELS OVER PHOTOS

TIP: White text with a black drop shadow shows up well over a photograph where either black or white alone would be hard to read (see "Shadow Label"). To get this effect in ReadySetGo version 4.5, follow these steps.

1. Create a text block, select it, and use the Specifications command from the Edit menu to set the Ignore Runarounds option. Type the label in the text box and set its font, size, and other type specs.

2. Duplicate the text block and offset the second block slightly. I use the Duplicate command from the Edit menu, specifying vertical and horizontal offsets of –0.03.

3. Select the top text and use the Color command from the Text menu to make the top text white.

ReadySetGo doesn't display white text on the screen unless the text has a non-white background fill, but the white text does print properly.

Jim Alley
Savannah, Georgia

You can get the same effect in PageMaker 3.01 and in most paint and draw applications. Use the Copy and Paste commands to duplicate the text, and offset the duplicate by dragging.

MACRO DOES ALL FORMATS

TIP: Why write separate macros for specific formatting options in Microsoft Ex-

(continues)

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1040:1																
	A	B	C	D	E	F	H	I	K	L	M	O	P	R	S	
35	35		Subtract line 34 from line 32. Enter the result here.											35		
36	36		Multiply $1,950 by the total number of exemptions claimed on line 6e.											36		
37	37		**Taxable Income.** Subtract line 36 from line 35. Enter the result (if less than zero, enter zero)											37		
38			**Caution:** If under age 14 and you have more than $1,000 of investment income, check here										☐			
39			and see page 17 to see if you have to use Form 8615 to figure your tax.													
41	38		Enter tax. Check if from: ☐ Tax Table, ☐ Tax Rate Schedules, or ☐ Form 8615											38		

1040:2																
	A	B	C	D	E	F	H	I	K	L	M	O	P	R	S	
35	35		Subtract line 34 from line 32. Enter the result here.											35		
36	36		Multiply $1,950 by the total number of exemptions claimed on line 6e.											36		
37	37		**Taxable Income.** Subtract line 36 from line 35. Enter the result (if less than zero, enter zero)											37		
38			**Caution:** If under age 14 and you have more than $1,000 of investment income, check here										☐			
39			and see page 17 to see if you have to use Form 8615 to figure your tax.													
41	38		Enter tax. Check if from: ☐ Tax Table, ☐ Tax Rate Schedules, or ☐ Form 8615											38		

Virtual Tabs

As a rule, spreadsheet applications don't support indentation and tabs, but you can simulate them by using narrow columns for spacing. The top window shows the effects of this technique. Gridlines in the bottom window show where the extra columns are.

cel? Nearly always there's a cell right on the worksheet that has the format you want. Just copy the source cell, select the target cell or cells, and execute the following two-line macro:

```
paste_format;=opt/command/f
=PASTE.SPECIAL(4)
=RETURN()
```

It's not fancy, but it's the most useful macro I have. Much faster than schlepping up to the menu, selecting Paste Special, and so forth.

William Casey
Minneapolis, Minnesota

SPREADSHEET INDENTS AND TABS

TIP: Tabs and indents are essential to effective, well-organized spreadsheets; but spreadsheet applications generally don't allow for tabs, and the Mac's proportional spacing doesn't produce proper alignment. However, a simple trick will make spreadsheets act as if they have tabs. Basically, you insert extra columns to provide uniform horizontal spacing.

To set up an indent at the left edge of the spreadsheet, make the first column width the size of the indent and the second column wide enough for the widest entry. Put indented entries in the second column and nonindented entries in the first column. (The nonindented entries in the narrow first column will automatically extend into the second column.) For x levels of indentation, set the widths of the leftmost x columns to the size of an indentation space, and make the next column to the right wide enough for the widest entry. "Virtual Tabs" demonstrates the technique.

Robin Elizabeth Wolfson
Sacramento, California

REPRINT SPOOLED PRINT JOB

TIP: Ever wish you could intercept a spooled print job and increase the number of copies, or perhaps reprint a job quickly? Such flexibility is especially desirable with reports that take a long time to generate. The SuperMac print spoolers—SuperSpool and SuperLaserSpool—don't let you reprint or change the number of copies. Neither does Apple's Print Monitor. However, you can get equivalent results by duplicating the spool folder immediately after a job begins printing. To do that in the Finder, select the folder and choose Duplicate from the File menu. You'll find the SuperMac spool folder, customarily named either SS Spool Files or SLS Spool Files, in the disk window. The Print Monitor spool folder is in the System Folder and is named Spool Folder.

To reprint the job, copy the icons in the duplicate spool folder (press the Option key while dragging the icons if the folders are on the same disk) into the real spool folder. Reprinting begins automatically.

Sometimes the spooling software gets confused by the sudden appearance of icons in the spool folder and so displays a spurious message describing an imaginary problem. Dismiss the message to continue the reprinting. You can reprint any number of times by recopying the icons. Duplicate spooled print jobs can be

(continues)

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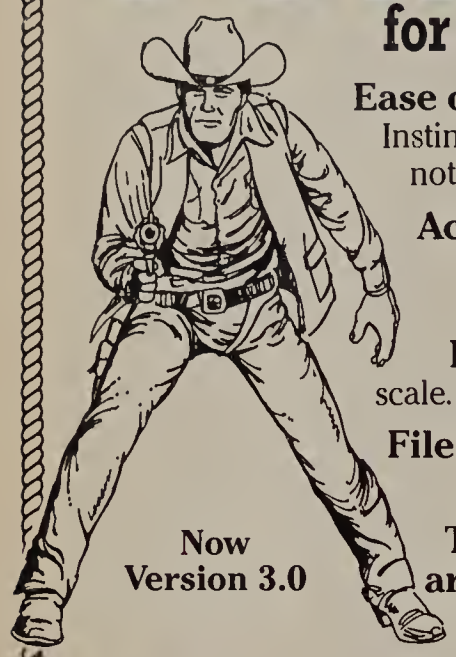

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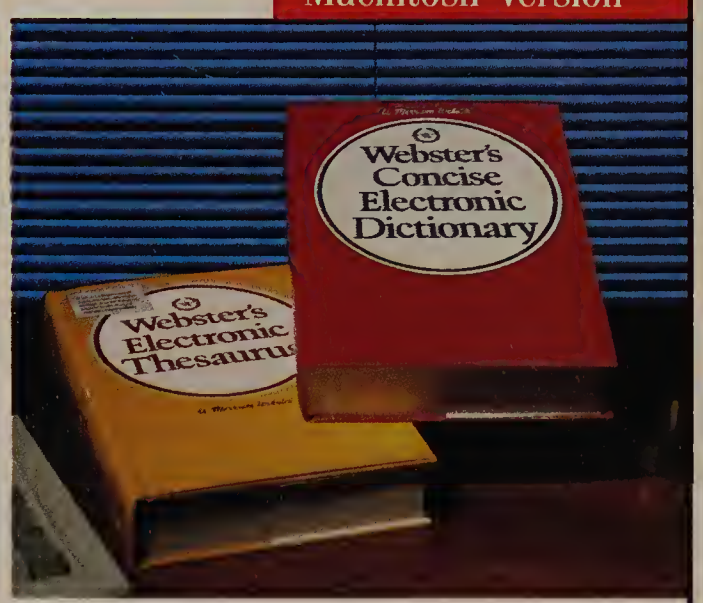

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Chicago, Illinois

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Lon Poole answers readers' questions and offers advice in this monthly column. Many of the tips he's collected can be found in Mac Insights *(Microsoft* Press, 1986). *His most recent book is the quick reference* HyperTalk *(Microsoft Press, 1988).*

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Getting Started with Digital Sound

From beeps to Bach, how to record and play back sound on the Mac

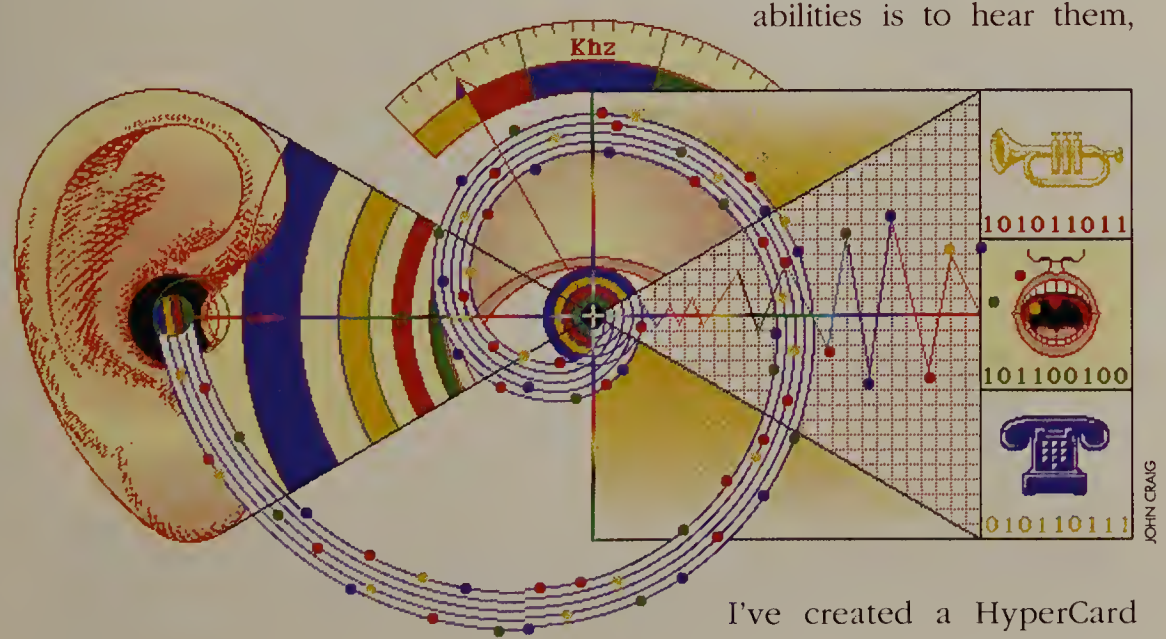
by Jim Heid

Have you heard? Computers are transforming the way we record and listen to sound. More and more, music is stored not in fragile vinyl grooves but in bits and bytes on silvery compact disks (CDs). Scratches, clicks, pops, and skips are becoming relics of the past.

And if you've explored the Sound option in the Mac's Control Panel desk accessory, you've noticed that you can choose from several digitally recorded beep sounds: a simple beep, a clanking sound, a monkey's squawk, and a springy "boing" that reminds me of the suspension on my first car. Compact disks and the Mac's monkey squawk may seem worlds apart, but the concepts behind them are similar.

When you combine digital audio with a general-purpose computer, suddenly the potential of digital sound goes beyond great-sounding Springsteen. The Mac's ability to record, manipulate, and play back sound opens doors to new applications in education, entertainment, music, business, and science.

This month, I examine the roles digital audio plays in the Mac world and I spotlight some of the sound-oriented products available for the Mac. "The Mac Sounds Off" explains how to modify your System file to add your own digitally recorded system beeps, and it reveals some sources for prerecorded sounds. And since the best way to appreciate the Mac's audio abilities is to hear them, I've created a HyperCard sound stack that aurally illustrates many of the concepts discussed here. Details on how to get the stack appear at the end of this column.



THE SOUND OF MAC

Digital audio can play so many roles that it might help if I summarize each one before taking a closer look at just how digital sound is produced.

- Digital sound is used to teach concepts that are difficult to grasp through written words or pictures. What does a red-tailed hawk sound like? How are numbers pronounced in Spanish? What's the difference between *legato* and *staccato?* For explaining concepts like these, a sound is worth a thousand words.
- Digital sound enlivens games with realism that phony beeps and squawks can't match. In Silicon Beach Software's Airborne arcade game, for example, you hear the screaming of fighter jets and the wash of helicopter blades. In Microsoft's Flight Simulator, you hear a digitized airplane engine and the skid of your landing gear. Electronic Arts' Pinball Construction Set gives you the bells and mechanical *thunks* of a pinball machine.
- In music, digital sound plays three roles. On one level, it makes possible Brøderbund Software's remarkable Jam Session, whose digitally recorded instruments turn the Mac into a six-piece band that can make even novice musicians sound good. On another level, the Mac's sound features enable musicians to alter sounds played by digital sampling keyboards such as Ensoniq's Mirage and E-mu Systems' Emulator series. On still another level, some additional hardware can turn the Mac into a professional audio workstation that can record and play back sound with the fidelity of a compact disk.
- Digital sound can enliven business presentations and training software. It also plays a specialized role in a unique sales product, Magnum's TFLX, whose hardware and software turn the Macintosh into a sophisticated system for recording telephone messages and taking orders.
- Scientists and medical researchers use Mac sound products to analyze brain waves and study heart rhythms. And at

(continues)

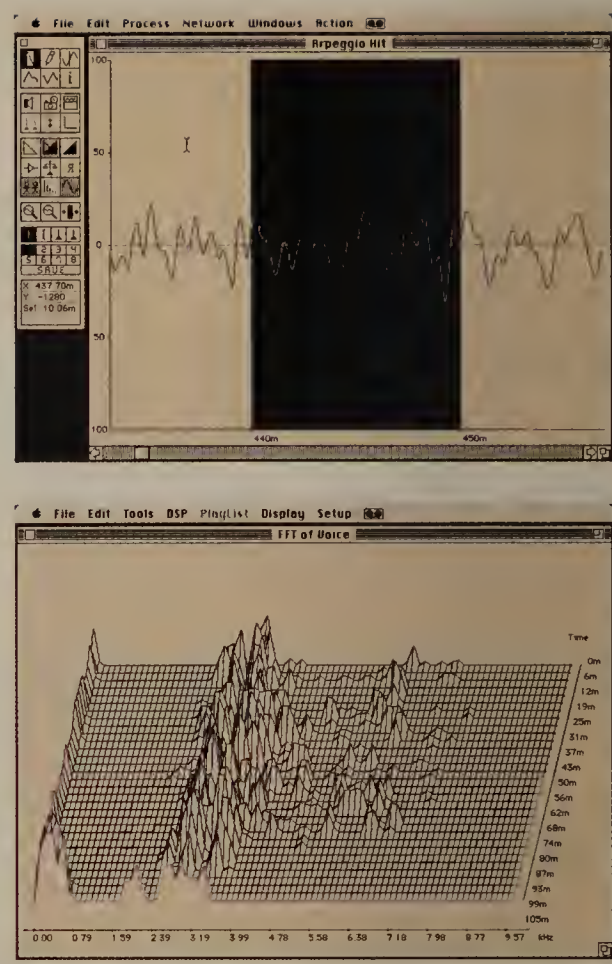
THE MAC SOUNDS OFF

You can add to the Mac's repertoire of digital beep sounds by adding SND resources to your System file. Hundreds of prerecorded sounds are available through online information services such as CompuServe and GEnie, through user groups, and through public domain and shareware clearinghouses.

The MacRecorder's SoundEdit, Digidesign's Sound Designer II, and Blank Software's Alchemy can save SND resources directly in the System file (or any other file, for that matter). You can also use a free HyperCard stack called Resource Library Manager (by Dave Bezaire), or Apple's ResEdit (the current version, 1.2, can even play SND resources).

Regardless of the program you use, be sure to make a backup copy of your System file in case something goes amiss during the modification process. After you've added an SND resource, use the Control Panel's Sound option to select it as the current system beep.

Using a variety of shareware or public-domain INITs (small programs that load during start-up), you can make your Mac sound off at other times, too. Two particularly noteworthy sound INITs include SoundMaster (by Bruce Tomlin; $10) and Chime (by Robert Flickinger; free). SoundMaster lets the Mac play sounds when you perform any of 11 tasks (such as inserting or ejecting a disk). Chime plays up to four separate sounds on the hour and at 15, 30, and 45 minutes past.



Snapshots of Sound
Sound-editing programs graphically display sampled sounds and let you edit them. At top, 10 milliseconds of a sampled piano arpeggio have been selected in Blank Software's Alchemy. At bottom, Digidesign's Sound Designer II depicts how a sound changes over time using a sound-analyzing techique called a fast Fourier transformation, or FFT.

Scotland Yard, some cutting-edge criminologists are using Macs to view and analyze voiceprints, which depict the characteristics of an individual's voice. Like fingerprints, no two are alike.

A SAMPLING OF TECHNICALITIES

To understand how the Mac records and plays back sound, think of a movie. By taking 24 photographs per second, a movie camera captures a reasonably accurate *sample* of the action in front of it. When those samples are played back, the illusion of smooth motion is created.

Digital audio also samples motion—the moving air molecules that make up sounds. Vibrating objects—whether strings, saxophone reeds, or vocal chords—produce *sound waves,* variations in air pressure that travel outward from the sound source like the ripples from a stone dropped into a pond.

A digital audio recorder samples these sound waves thousands of times per second. Each sample is a digital image of the sound at a given instant (see "Snapshots of Sound"). The samples, each recorded as a series of bits, are stored in memory and can be manipulated. Bits can be added or removed, their order can be altered, or their very values changed. Each modification alters the overall image of the sound wave, so when the samples are played back, you hear a different sound.

With movies, taking too few pictures per second results in jittery, unrealistic motion. With sound, taking too few samples per second results in a distorted recording that doesn't faithfully convey all the frequencies present in the original sound. The faster the *sampling rate,* the more accurate the recording, and the better the recorder is able to capture the highest frequencies. Compact disks are recorded at a rate of 44,100 samples per second, or 44.1kHz. Without specialized sampling hardware, the Mac's maximum sampling rate is 22kHz—too slow for recording-studio quality, but fast enough to allow the Mac to sound at least as good as an ordinary table radio.

Another factor that influences digital sound quality is the *sampling resolution*—the number of bits assigned to each sample. These bits store information about the sample's *amplitude,* or loudness. The more bits assigned to each sample, the more accurately the recorder can store and recreate the original sound's variations in loudness. A compact disk player has a 16-bit sampling resolution, allowing it to reproduce thousands of distinct volume levels. The Mac has an 8-bit sampling resolution; it can store and re-create only 256 volume levels. When a given sample's amplitude lies between two levels, it's rounded to the nearest one. This rounding of amplitude information, called *quantization,* is what causes distortion.

REQUIRED EQUIPMENT

Before digitally recorded sound can be played back, the discrete bits of digital data generated during sampling must be translated back into continuously varying volume levels. This job is performed by a hardware component called a *digital-to-analog* converter. Because all Macs contain one, they can play digital sound without additional hardware. For better sound quality, however, you'll want to attach the Mac to a stereo system or external amplifier as shown in "Wired for Sound."

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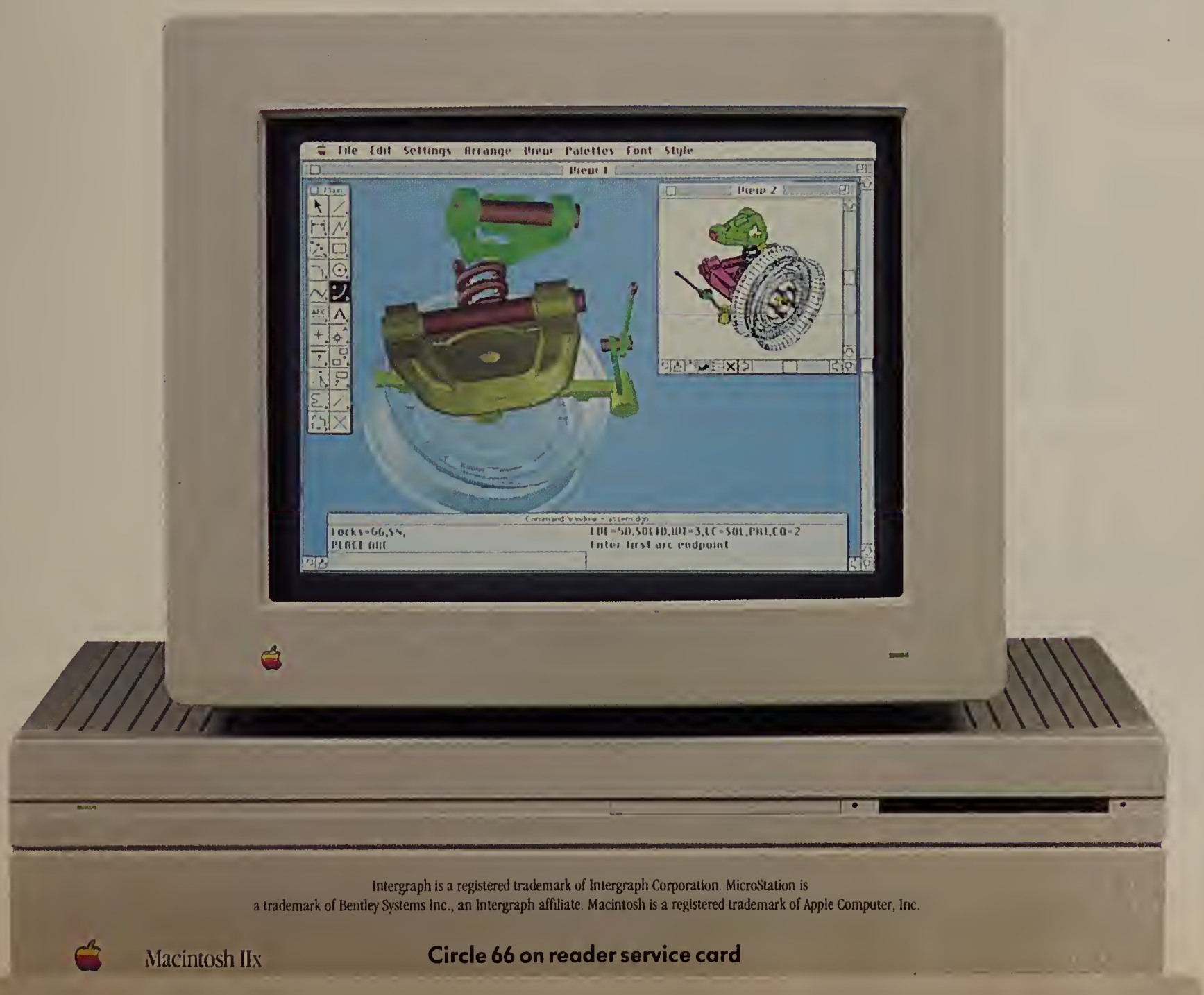
Image showing the Apple Macintosh user interface.



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Macintosh IIx

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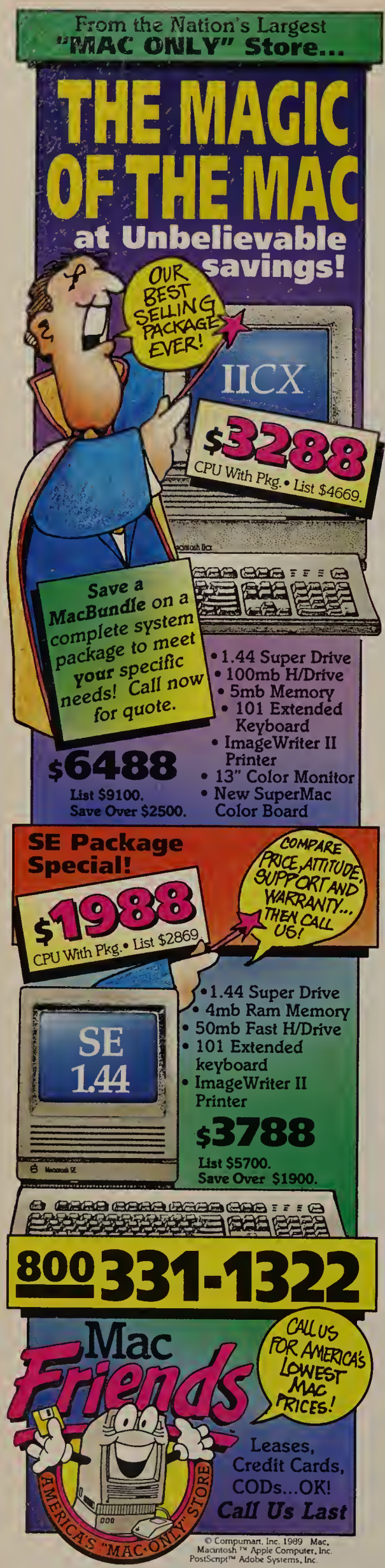

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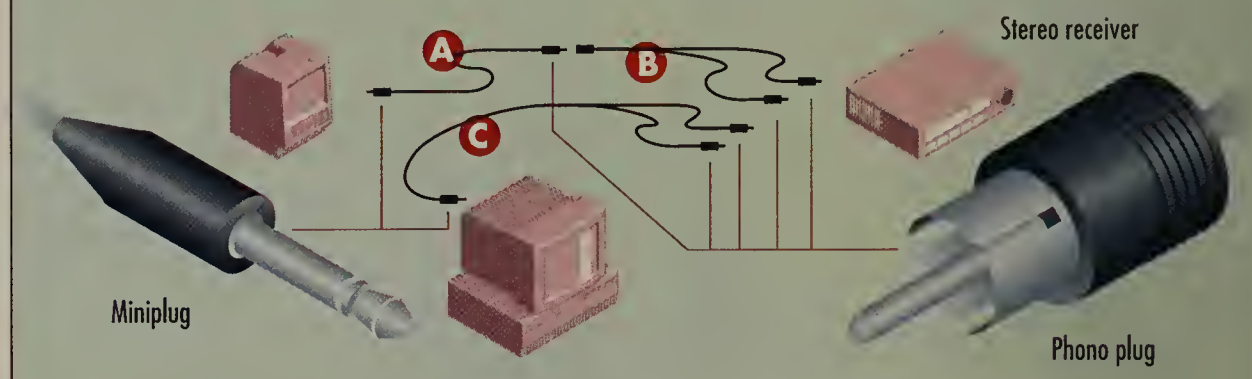
Wired for Sound



For better sound quality, connect a Mac to a stereo system. For monophonic Macs (the SE, Plus, and earlier machines), one cable has a ⅛-inch miniplug on the Mac end, and a phono plug (Radio Shack catalog number 42-2444) on the other end **(A)**. The other cable is a "Y" adapter with a phono plug on one end and two phono plugs (Radio Shack number 42-2435) on the other **(B)**. For stereo Macs (the Mac II, IIx, IIcx, and SE/30), all you need is a cable with a ⅛-inch stereo miniplug on the Mac end and two phono plugs (Radio Shack number 42-2475) on the other **(C)**. Important: Before turning your stereo on, turn its volume control all the way down and use the Mac's Control Panel to turn the Mac's speaker volume all the way down. Then turn the stereo on and adjust its volume and the Mac's to a comfortable listening level.

To record sound, the Mac needs an *analog-to-digital* converter, which measures the voltage levels coming from a microphone or other sound source and translates them into digital data. The most popular analog-to-digital converter for the Mac is part of Farallon Computing's MacRecorder package.

The MacRecorder hardware is a box slightly larger than a cigarette pack. Besides the analog-to-digital converter, it contains a filter that removes high frequencies that can't be accurately sampled at 22kHz. Completing the package are a small microphone, a volume control, and jacks for an external microphone, tape recorder, or other sound source.

The MacRecorder 2.0 software comprises three components: SoundEdit, a recording and editing application; HyperSound, a HyperCard stack that lets you record and play back sounds from within HyperCard; and HyperSound Toolkit, a potpourri of HyperCard external commands (XCMDs) and external functions (XFCNs) that stack authors can use to give any stack digital recording features. You could use the HyperSound Toolkit to create an appointment stack that recorded spoken reminders and then played them back at a specified time.

The SoundEdit application is your primary link to the MacRecorder hardware. SoundEdit displays a recorded sound as a *waveform* (see "Riding the Waveform"). You can zoom in on the waveform display to look at an individual *cycle* (one back-and-forth phase of the sound's vibration), or zoom out to see the entire recording. You can select part or all of the waveform and cut or copy it to the Clipboard to rearrange the notes in a musical passage or the words in a phrase. You can also modify the sound, adding reverb to simulate a concert hall, or filtering certain frequencies to improve the sound quality. You can even reverse the sound to make it play backwards.

With two MacRecorders you can record in stereo. (In theory, you can record in stereo using one MacRecorder by recording each channel separately, but synchronizing the channels is difficult.) You can play back stereo sounds on any stereo Mac—the SE/30, II, IIx, or IIcx.

But be forewarned that digital sound devours memory and disk space. With a 22kHz sampling rate, one second of sound uses 22K of memory and the same amount of disk space (double that for stereo). A Mac with 2MB of memory has room for about 70 seconds of 22kHz audio. When you're willing to trade fidelity for longer recording times, SoundEdit lets you specify sampling rates of 11, 7, and 5kHz. On

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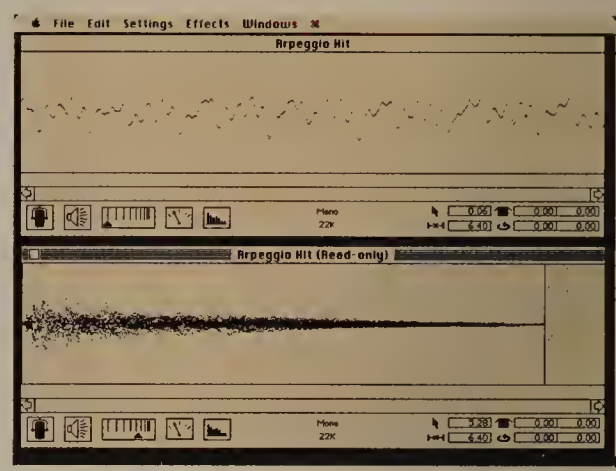

Riding the Waveform
The graphic display of a sound is called its waveform. Here are two waveform displays of the same sound, displayed by SoundEdit (part of Farallon Computing's MacRecorder package). The bottom window shows the entire recording; the top shows a small portion of it.

a 2MB Mac, these slower sampling rates provide recording times of 136, 204, and 273 seconds, respectively. SoundEdit also lets you use one of several *compression ratios,* which decrease storage requirements (and fidelity) by assigning fewer bits to each sample. Using the 8-to-1 compression ratio, a 2MB Mac can accommodate about 530 seconds of sound.

THE FORMATS OF SOUND

Every program category has its standard file formats, and sound-editing software is no exception. Although the SoundEdit application has its own file format, it also supports two important standard formats: *SND resources* (also known as *sound* or *'snd'* resources) and *Audio Interchange File Format.*

If there's a sound you'd like to use as a system-error beep in a HyperCard stack, you must save it as an SND resource. Technically, two types of SND resources exist. *Format 1* resources are generally system beeps, while *Format 2* resources are used by HyperCard and other sound-playing applications. In the early days of digital Mac sound, the distinction was more important; you couldn't use Format 2 SND resources as system beeps. Beginning with System 6.0.2, however, Apple made the Mac's Sound Manager a bit less picky. With System 6.0.2 and later versions, you can use either format for system beeps.

The Audio Interchange File Format

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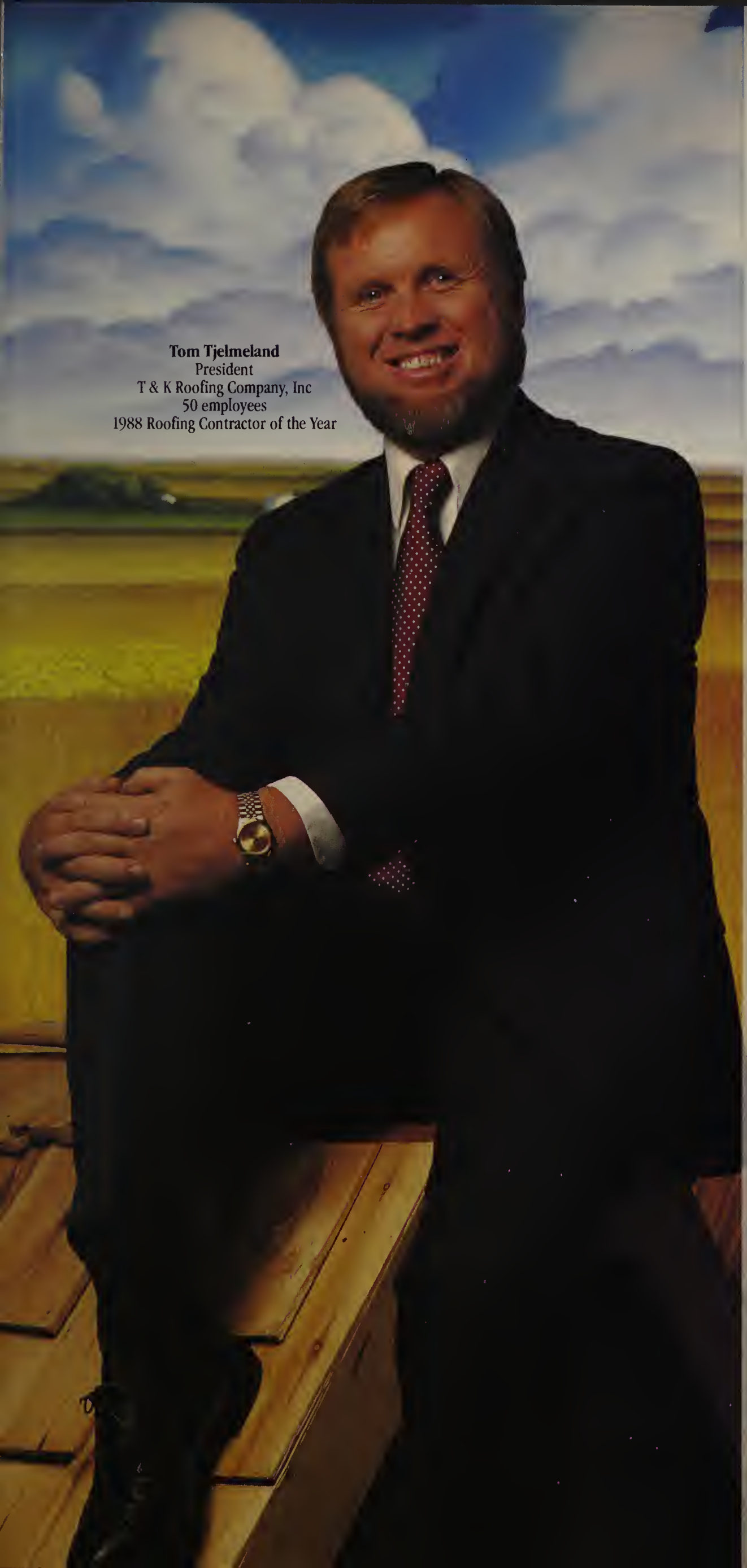

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(commonly referred to as either AIFF or Audio IFF) lets one program open a digital recording created by another program. You'll find support for AIFF files in professionally oriented sound software such as Blank Software's Alchemy and Digidesign's Sound Designer. AIFF is a preferred format for swapping files between such programs because it supports stereo recordings and 16-bit sampling resolution; SND resources can be stereophonic or monophonic, but they support only 8-bit resolution.

SOUND AT THE HIGH END

MacRecorder is a superb way to get sound into and out of the Mac, but it isn't intended for professional audio applications. To reach the upper strata of Mac digital audio, you need more sophisticated hardware such as Digidesign's Sound Accelerator board, which is available for the Mac II and the SE (an SE/30 version is in the works). Sound Accelerator contains a Motorola DSP56001 *digital signal processing* chip, a microprocessor designed for the data-shuffling demands of digital audio. (Steve Jobs's Next computer also contains a DSP56001 (for details on this remarkable chip, see "What's Next?," *Macworld,* January 1989).

The Sound Accelerator board allows the Mac to play back stereo CD-quality audio; that is, sound sampled at 44.1kHz with 16-bit resolution. Team a Sound Accelerator board with Digidesign's AD In analog-to-digital converter, and the Mac becomes a CD-quality, stereo digital-audio recorder that lets you record and play back digital sound directly to and from a Mac's hard disk. Digidesign's Sound Tools system includes a Sound Accelerator board, the AD In adapter, and software that lets you visually edit digital recordings. Composer Philip Glass recently used the Sound Tools system to record a solo piano album for CBS Masterworks records.

Like the MacRecorder's SoundEdit application, the Sound Tools software—called Sound Designer II—graphically displays digital recordings and lets you alter them. But Sound Designer II's capabilities go far beyond SoundEdit's. You can, for example, alter a recording's pitch without changing its tempo, or alter its tempo without changing its pitch. A composer working on a commercial jingle might use the latter feature to squeeze a 35-second jingle into a 30-second time slot.

These digital edits require the Mac to perform thousands—sometimes millions—of computations. The Sound Accelerator signal-processing chip helps there, too. In one test I performed, a Mac II took 14 minutes to change an 8-second recording into a 5-second one. Equipped with a Sound Accelerator, the Mac took only 55 seconds.

Speaking of amazing statistics, get this: a one-minute Sound Tools recording requires *10 megabytes* of disk space. And because Sound Tools swaps data between memory and disk during recording and playback, it requires a fast hard disk with an average access time of 28 milliseconds or less. (For a list of capacious drives that meet this requirement, see "High-Capacity Hard Disks," in this issue.)

Digidesign is working on a new board that will provide record and playback capabilities and is intended for multimedia applications. The company says it will be priced at less than Digidesign's Sound Accelerator.

SAMPLING SAMPLERS

Just as digital sound has made its mark in the Mac world, it has also significantly influenced the music industry. Musicians are embracing a new generation of keyboards called samplers. Like a Mac equipped with a MacRecorder, a sampler digitally records and plays back sound. But with a sampler, you can play the sound at different pitches simply by pressing different keys. Record just one pitch of a given instrument, and you can instantly "play" that instrument from the sampler's keyboard.

Actually, most samples sound artificial when transposed too high or too low. Therefore, most sampling keyboards divide the range of notes into multiple samples, each of which plays a range of only an octave or so. This technique, called multisampling, avoids having to transpose a sample too high or low.

Programs like Sound Designer II let you simultaneously view and alter a

(continues)

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sampler's sounds. This capability is especially useful for setting a *loop point*, a portion of a sample that repeats as long as a key is pressed. Because few samplers display waveforms graphically, it's difficult to find the perfect loop point using a sampler's editing commands. When you can see the waveform, however, setting loop points is far easier.

Another popular sample-editing program is Blank Software's Alchemy, which performs much of the same magic as Sound Designer II. One of Alchemy's primary strengths is its ability to change the sampling rate of a recorded sound. This *resampling* capability allows you to transfer sounds between samplers that use different rates. Musicians can store all their sound samples on the Mac and use Alchemy to shuttle them between samplers as needed for more versatility. (Digidesign's Sound Designer Universal also has this capability.)

NOW HEAR THIS

There's no better way to learn about digital audio concepts than to hear them. If you subscribe to CompuServe or Connect, you can download a free HyperCard stack I created to complement this column. The stack is called, logically enough, Jim Heid's Sound Stack. On CompuServe, it is located in the HyperCard forum (GO APPHYPER). On Connect, it's in the HyperCard portion of the Macintosh Symposium. I've also encouraged its distribution through user groups, so you can probably copy it from someone else. But be advised: the stack occupies an entire 800K floppy disk and will take a considerable amount of time to download.

And that illustrates a problem: At present, digital audio requires too much memory and disk space to be practical for many applications that could benefit from it. A talking tutorial that explains a program's features might be valuable, but would you be willing to donate half your hard disk to it?

The Mac's System 7.0 software, due to be released sometime next year, will lessen the storage burden by allowing digital recordings to be stored in a compressed form and expanded during playback. System 7.0 will also allow the Mac to play multiple sounds simultaneously; with System 6.0, only one recording can play at a time.

These enhancements should allow sound to work its way into more types of applications—and to create entirely new application categories. Soon, you may be able to annotate documents with spoken comments and send voice-mail messages to other users on a network. You might protect sensitive documents with a password utility that recognizes only your voiceprint. Or you might enjoy stereo sound effects in your quest to save the galaxy.

In other words, the Mac's audio features are impressive now, but we haven't heard anything yet. ■

Jim Heid is a Macworld *contributing editor who focuses each month on a different aspect of Mac fundamentals. His latest book is* Inside the Apple Macintosh, *an advanced user's guide to the Mac, published by Brady Books.*

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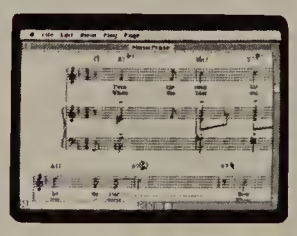

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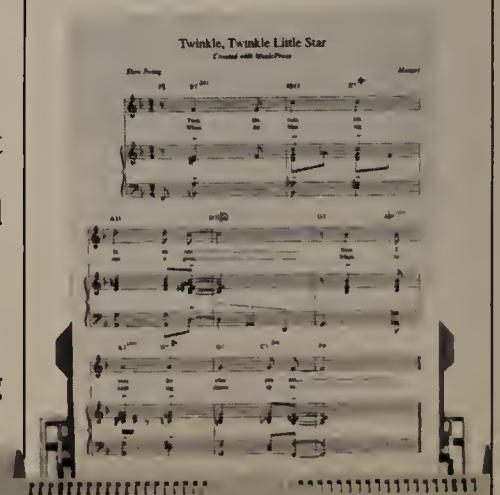

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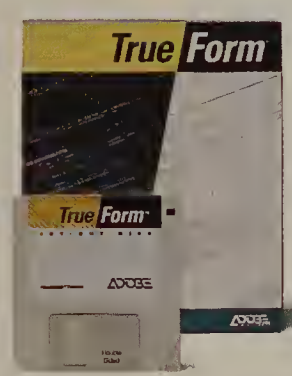

What's more, because TrueForm is actually two programs—Set-Up and Fill-Out—you won't have to buy the entire Trueform package when you add users. Simply purchase additional Fill-Out packages whenever you need them.

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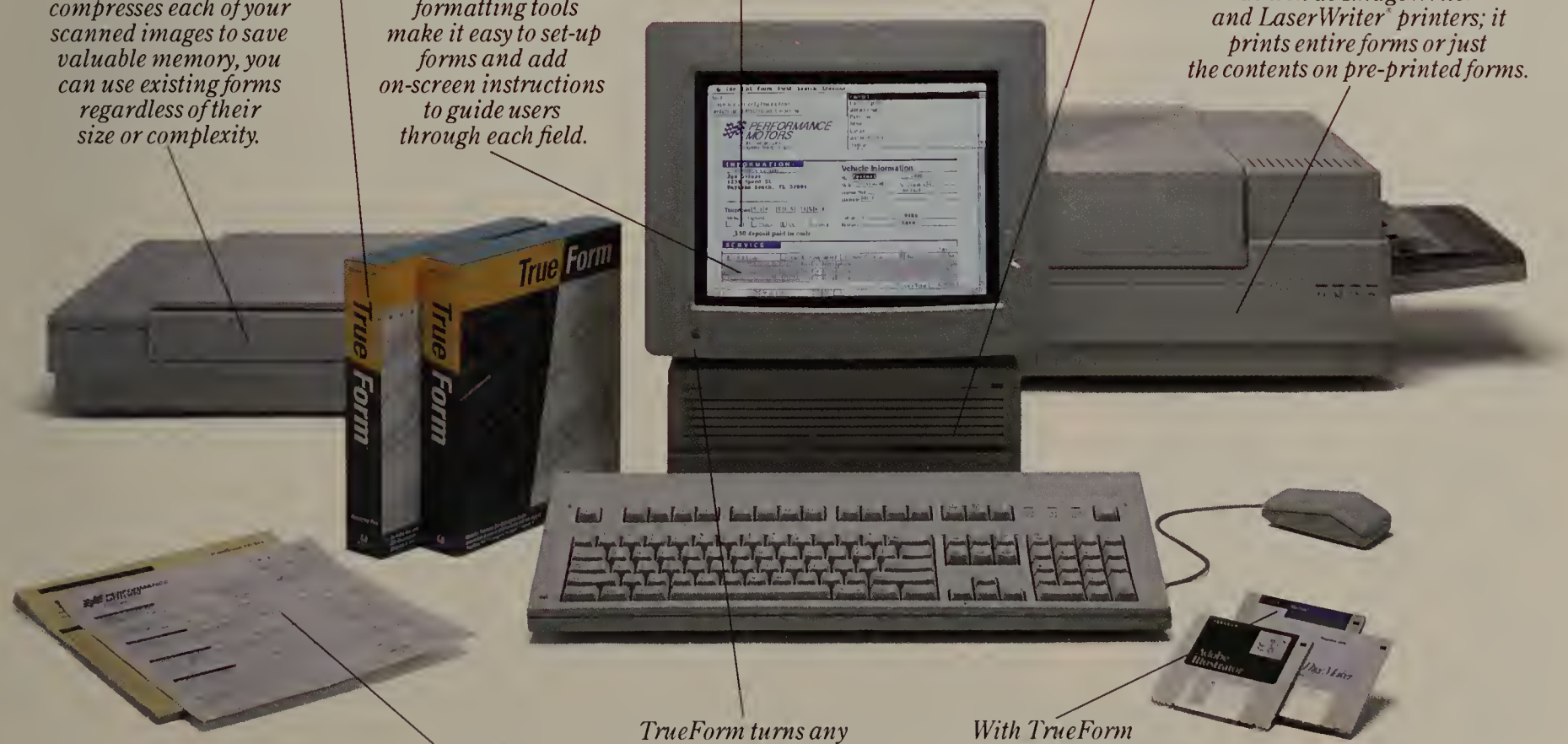

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Insights on MacWrite II 1.1

Tips on using the latest version of the first Mac application

by Charles Seiter

MacWrite II appeared in the spring of 1989, a flagship product of Apple's software spin-off, Claris. The result of much careful market research, the new version of MacWrite satisfied most of the wishes of longtime MacWrite users, who were still faithfully using a program lacking most of the features expected in an office-quality word processor. MacWrite II brought the features list up to snuff, and it did so in a way that doesn't require much retraining for old MacWrite hands. Here are some hints, suggestions, and productivity tips.

SIGNING UP

Many registered users of MacWrite got their copies of MacWrite II as a result of an upgrade offer. However, according to Claris, this does *not* mean that they are registered users of MacWrite II. You must send in the MacWrite II registration or drift forever in ghostly unrecognized status. You won't hear about upgrades if you don't register as a MacWrite II user.

WHOSE DEFAULT IS IT, ANYWAY?

You may want to set the ruler, spacings, and other text stylings as a default. There is a standard way to save this information, as a MacWrite II Stationery file, but it requires you to find the Stationery document after MacWrite II starts. Here is a simpler way: first design a document that includes your choices from the Preferences dialog box, Ruler selections, and type styles; next choose the Save As command and select MacWrite II Stationery as the file format; then save the file with the special name MacWrite II Options in the System Folder. The key points to remember are that the file must be in the Stationery format and it must be saved in the System Folder. The next time you open MacWrite II, it will use the defaults you have selected and display them in the untitled document it puts on screen.

MORE OPTIONS (AND COMMANDS, AND DOUBLE-CLICKS)

Although having your own preset defaults is a great convenience, it can become quite inconvenient if you simply want to return to MacWrite II's presets. Instead of changing the Autostationery file, all you have to do is hold down the Option key when opening a document and MacWrite picks its own presets instead.

An option that actually saves time, especially for poor spellers, is the beep on questionable spellings choice in the Spelling Options dialog box. The speed advantage is that, when the program beeps, it has already selected the questionable word. You just press ⌘-Y to check that word, and the spelling-checker dialog box appears. When you finish the document, all your typing has been corrected (and the beeping serves a conditioned-response pedagogical function for your favorite mistakes).

The Option key is also useful for deciphering fonts. MacWrite II shows fonts on its Font menu as they will appear in text—a fine choice for standard type-style selection but pretty cryptic for Belmont, Symbol, and other math or engineering specialty fonts. Hold down Option when you open the Font menu to see the fonts listed by name in plain Chicago.

You can use MacWrite II to change background colors. Holding down the ⌘ key when you open the Color submenu under Style makes your choice refer to the background. Before you do this, you will probably want to adjust background color choices in the Control Panel.

To double your speed, try these double-clicks. For fast access to the Page Format dialog box, double-click on the little page icon in the lower left-hand corner. To open the Go To Page dialog box, double-click on the page-number box. To see the Paragraph dialog box, double-click on any of the line-spacing icons in the ruler.

WITH STYLE

Although MacWrite II appears to lack a style sheet feature, you can create a reasonable facsimile by judicious use of Stationery files and a few other tricks. The usual form of a Stationery file is a document containing a company logo, date stamp, and standard salutations and closings. In a more refined variation, a Stationery file can be saved with a variety of custom rulers (see "Moving Stationery").

In this scheme you select the line or lines whose format you wish to copy, pick

(continues)

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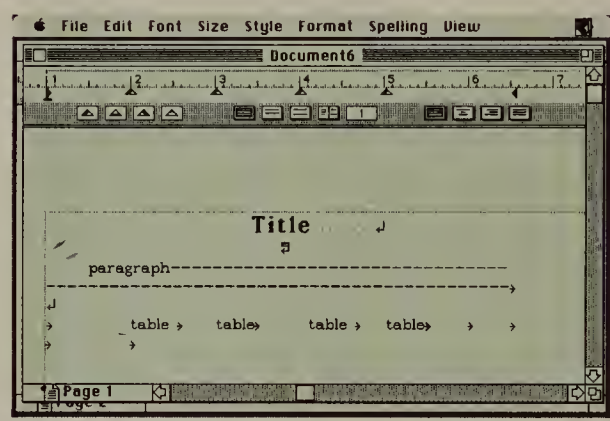
Copy Ruler under the Format menu, and then Apply Ruler to a block of selected text. The labels for sections in the Stationery document are really just reminders to yourself, a code for the set of ruler settings. When you have used the rulers you need, just erase the part of the document with the custom rulers and save the rest as an ordinary MacWrite II file.



Moving Stationery
Besides holding the equivalent of letterhead and envelope formats, a Stationery file is a good place to store frequently used special rulers.

HELP ON THE WAY

The View menu contains some useful options, among them the Show Pictures/Hide Pictures command. Using this command you can construct a custom Help screen for yourself that shows your most frequently used (or most difficult-to-memorize) keyboard equivalents (see "Hidden Mysteries"). Type out the commands you need in MacPaint or another program that can save MacPaint or PICT format. Put this file into your documents with the Insert File command under Edit, and then use Hide It, preferably at the top of the document. To find and view your custom menu, use Show It (control-A).This pops you to the top of the document and shows the picture.

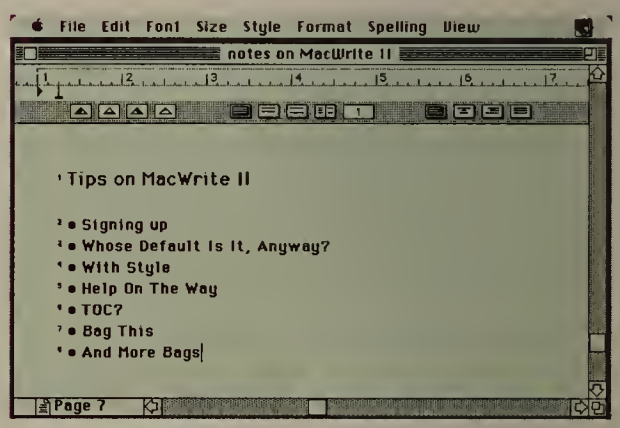
TOC?

Although you can't really do automated table-of-contents work per se in MacWrite II, there is a way to accomplish something similar. The footnoting function in MacWrite II allows notes to be specified as endnotes, meaning that all notes are collected and numbered at the end of the document. As you compose the document, just select headings and subheadings, copy them, pick the Insert Footnote command under Format, and paste the headings and subheadings as footnotes. You will find all of these collected in a nice stack (see "Feet on the Table") at the end of the document, and this scheme has the advantage of preserving the "table of contents" order even if you shuffle sections.

HIDDEN SYMBOLS AND THEIR COMMANDS: USE IN FIND/REPLACE

Action	Keys	shows as
return	CMD-Return	/p
tab	CMD-tab	/t
column break	CMD-Enter	/c
line break	CMD-SHT-Ret	/n

Hidden Mysteries
You can create a series of custom help screens and make them appear and disappear with the Hide/Show Pictures command. The Find/Replace option can also find graphics hidden in a document, in case you have lost track of their positions or failed to leave little markers in the text.



Feet on the Table
The Footnote function in MacWrite II can be entrained to produce semiautomatic tables of contents, like this collection of some headings from a draft of this article.

ENVELOPES

MacWrite II includes some prepared Stationery templates, but it doesn't offer one for envelopes. You may want to experiment, but these settings for envelopes are a good place to start. Use a clean new document (no tabs or formatting). Pick US letter, horizontal mode, from Page Setup (under File). Put six carriage returns at the top. For formatting, in the Page dialog box set all margins to 1 inch, and in the Paragraph dialog box set the left indent to 5 inches and the right indent to 9.5 inches.

(continues)

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Try typing in a sample address and printing it on an envelope. If the result is satisfactory on your envelopes, save this as a Stationery file called Envelope 1.

. . . AND MORE ENVELOPES

Call up Envelope 1, and erase your sample address. If you have a mailing-list database saved as tabbed text, choose the Open Merge Data File command under File. After you pick your mailing list file, you can select the Insert Merge Field command and identify the elements of the address. If you're careful, you can print all the envelopes and all your form letters in one session, collecting the envelopes and letters in exact mailing-list order (sorted, for example, by zip code) for efficiency.

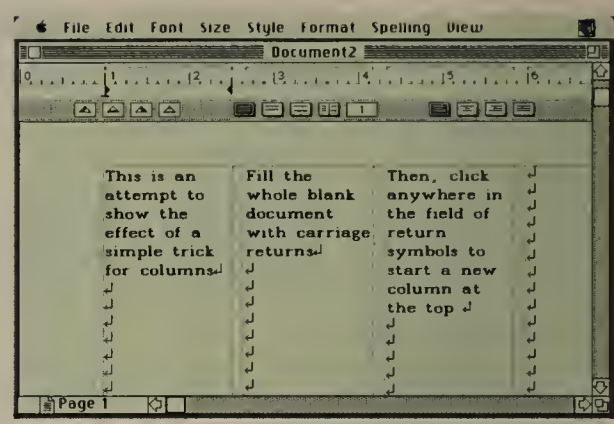
LAUNDERING THE LISTS

You may be working with a mailing list that was saved as text with delimiters other than tabs. This happens with some lists ported from IBM PC or mainframe applications, for example. The merge facility is quite forgiving, at least on small, regular lists in which all fields are filled, but to assure trouble-free operation, you should replace those other delimiters with tabs. Just open the text document in MacWrite and use the Find/Replace command with a comma (one typical example) as the Find item and ⌘-T (shown as \T on screen) as Replace With.

Under these circumstances, you may note that since you're replacing commas with invisible characters, you have to choose Unselect Text in the Set Attributes dialog box. Otherwise you end up with the literal combination \T as the delimiter in the records of your mailing list.

BANISHING THE SNAKES

The Columns function in MacWrite II (found in the Page menu item under Format) assumes that you will be typing text in *snaking* style—in which text flows from one column to the next continuously. If you want to produce newspaper-style columns, make up a Stationery document with multiple columns and fill it with carriage returns. You can then select positions at random in the columns and start typing, without seeing all your work collected into a single text-snake (see "Columns—Newspaper Style").



Columns—Newspaper Style
A simple trick circumvents MacWrite II's column format limitation. Prepare a Stationery document with the right number of columns and fill it with carriage returns. Then you can simply click on a position and start typing, defeating the snaking-columns-only aspect of the program.

SLIDING WHILE YOU MERGE

Many mailing list databases contain omissions or irregularities—addresses can consist of many fields, some of which are blank. This can produce both form letters and envelopes with unacceptable aesthet-

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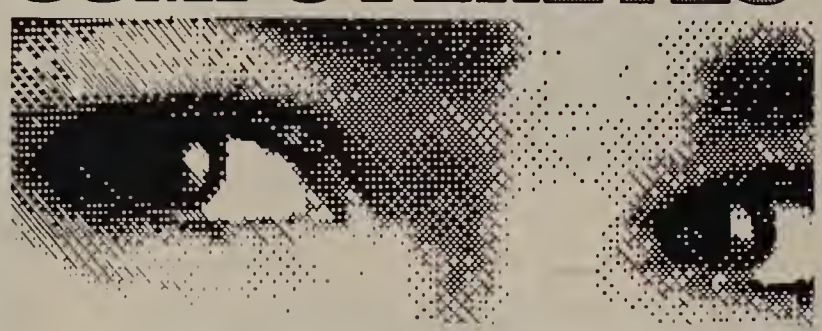

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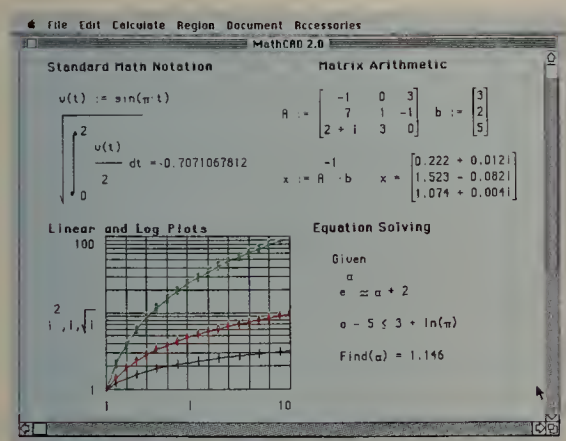

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ics. Fortunately, MacWrite II's merge feature accepts conditional statements, so that, besides being able to pick out all database records with zip codes between 60000 and 70000 for a mailing, it can tidy up printing of records with blank fields, sliding some contents over the empty fields.

Here's an example of the selection logic needed to close up a set of address fields at the beginning of a form letter.

```
«Company»«IF Company <> ""»RETURN
«ENDIF»«Title»«IF Title <> ""»RETURN
«ENDIF»«First» «Last»«IF First <>
 ""»RETURN
«ENDIF»«Street-1»«IF Street1 <>
""»RETURN
«ENDIF»«Street-2»«IF Street-2 <>
 ""»RETURN
«ENDIF»«CityStateZip

Dear «First»«IF First = ""»Sirs«ENDIF»:

    We are glad you have decided to
    subscribe to Macworld. We hope
    you find some helpful tips for
    streamlining your work.

    Yours truly,
```

The merge won't budge until it hits a field that contains something. If the whole database record has only one "live" field, that's the only one that will print and there won't be any extra blank lines. Note that in this example the program is also looking for a first name to use in the form letter, inserting "Dear Sirs" instead of "Dear Harold" or something similar if no first name is available in the record.

SHARING THE WEALTH

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips, Macworld*, 501 Second St., San Francisco, CA 94107. ■

See *Where to Buy* for contact information.

Charles Seiter is a Macworld *contributing editor who regularly reviews word processing programs for the Macintosh.*

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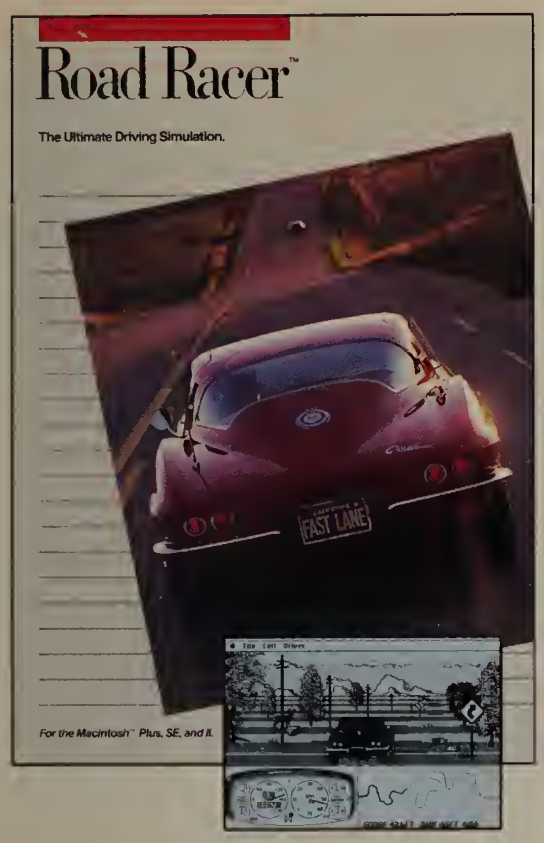

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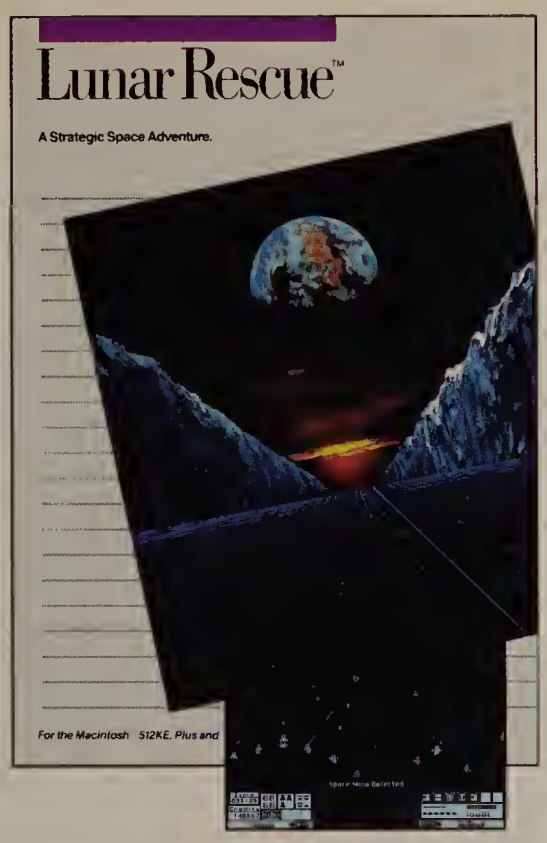

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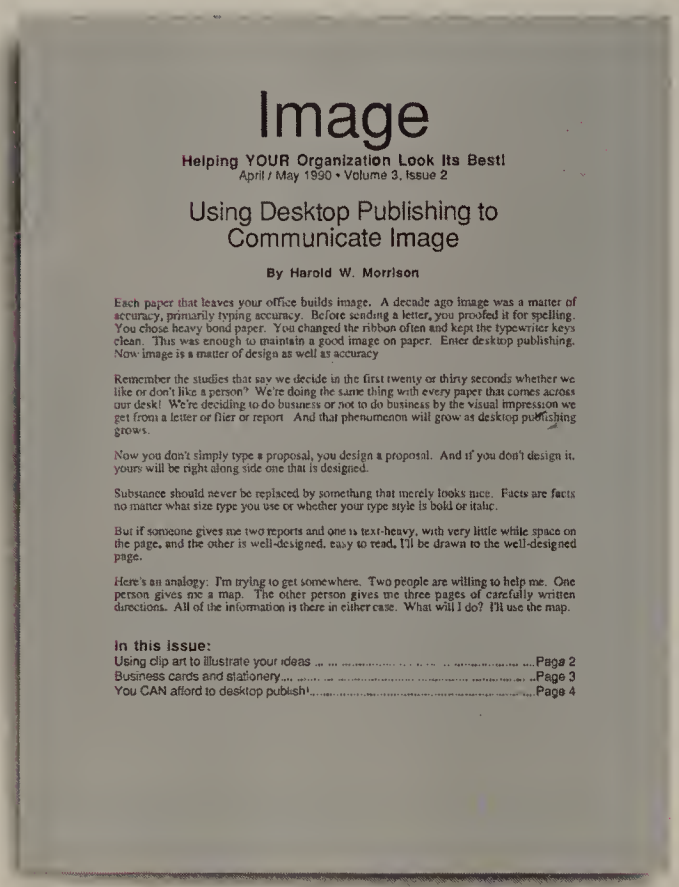

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April / May 1990 • Volume 3, Issue 2

Using Desktop Publishing to Communicate Image

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Each paper that leaves your office builds image. A decade ago image was a matter of accuracy, primarily typing accuracy. Before sending a letter, you proofed it for spelling. You chose heavy bond paper. You changed the ribbon often and kept the typewriter keys clean. This was enough to maintain a good image on paper. Enter desktop publishing. Now image is a matter of design as well as accuracy

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Using clip art to illustrate your ideas ....Page 2
Business cards and stationery....Page 3
You CAN afford to desktop publish!....Page 4

Your word processor alone.

Soon After.

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UPDATES

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Control version 1.5 is a revision of this manufacturing and sales software. It has an optional built-in word processor and mail-merge feature; it automatically finds product information in a product file, keeps track of balances on invoices that have been applied to orders, and contains an expanded set of reports. Also includes a new user interface and hierarchical menus. Diamante Software, 11651 Plano Rd., #160, Dallas, TX 75243; 214/341-6711. Free; $1295 new.

FAXstf version 2.0 allows multiple users to share a fax modem on a network, exports received fax files, has the capacity to automatically generate cover pages, does landscape printing, and has a revised user interface. STF Technologies, 1817 Main, Higginsville, MO 64037; 800/426-1679. Free to owners who registered the product before July 15, 1989; $49.95 to those who registered later; $695 new.

Finale version 1.2 adds a feature for handling custom symbol fonts. Coda Music Software, 1401 E. 68th St., Bloomington, MN 55425-1126; 612/854-1288. Free; $599 new.

MacRecorder version 2.0 has a new series of XCMDs and drivers that let you play compressed sounds, record directly into a stack, test volume input, and play stereo sound on the Mac II. Has four different compression ratios. Spectrum-analysis tools have been added to the SoundEdit program. Farallon Computing, Inc., 2150 Kittredge St., Berkeley, CA 94704; 415/849-2331. $40 plus $10 s/h if originally purchased before January 15, 1989; $10 if purchased after that date; $249 new.

Music Publisher version 2.0.3 performs MIDI input from a keyboard and MIDI playback to various output devices. Runs 50 percent faster than previous version. Repertoire, 200 Seventh Ave., #225, Santa Cruz, CA 95062; 408/476-1753. Free; $495 new.

Nisus version 2.0 includes footnotes, endnotes, and hyphenation. Adds color and the ability to search for text marked with colors (with or without a color screen). Dialog screens have been redesigned and large macro files have been divided into smaller files for easier manageability. Has visible graphics anchor so you can see on screen where graphics are anchored. Paragon Concepts, 4954 Sun Valley Rd., Del Mar, CA 92014; 619/481-1477. Free; $395 new.

Panorama version 1.1 adds automatic phone dialing, financial and time functions, support for EPS pictures, relational reporting capability, additional chart functions, and the ability to store and play back sounds. ProVue Development, 15180 Transistor Ln., Huntington Beach, CA 92649; 714/892-8199. Free; $395 new.

Personal Golf Stats version 2.0 has more than 10 different graphs of game and hole-by-hole statistics; increased numbers of statistics.

(continues)

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Supports cut, copy, and paste, and undo and redo for all functions. Creative Computer Resources, 135 Verona Dr., Goleta, CA 93117; 805/968-6247. Free; $79 new.

QuarkXPress version 2.11 adds an Open Prepress interface to send high-resolution color to output devices; supports additional printers: CG9000PS, Schlumberger 5232, and Monotype. Quark, 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211. Free; $795 new.

Quicken version 1.5 gives user access to information on trends in spending habits, credit policies, and cash requirements. Lets user record handwritten checks and ATM transactions, generates management reports, and allows up to seven splits per transaction. Intuit, 540 University Ave., Palo Alto, CA 94301; 415/322-0573. $8, if original purchased after May 8, 1989, $19.95; $59.95 new.

QuickLetter version 1.01 is a maintenance release that improves the pasting of an address from the address book into a letter (address now pastes at cursor location) and users' ability to click and move text in Page Preview dialog. Working Software, 740 Front St., #318A, Santa Cruz, CA 95060; 408/423-5696. Free; $124.95 new.

Snap version 3.1 has stroked fonts, supports GTCO digitizers, and adds a Change Text command and Put Symbols on Active Level switch. Command key-ins can now be done from Snap menu buttons. This version also lets you cut, copy, and paste in the key-in window. Forthought, P.O. Box 32, Sunset, SC 29685; 803/878-7484. Free; $395 new.

Spellswell version 2.1 is now compatible with Microsoft Word 4.0 and Acta 3.0. Includes Word Choices feature and automatic guessing; checks for a space before a punctuation mark; can use more than one dictionary to check a document. Working Software, 740 Front St., #318A, Santa Cruz, CA 95060; 408/423-5696. Free if originally purchased before March 15, 1989; $25 if purchased after that date; $74.95 new.

SuperGlue II with GlueNotes version 2.1 prints to disk with full color, has font character and line lock, opens PICT files, allows user to append GlueNotes to images, has selection lasso, and opens and prints GlueNotes. Solutions, 30 Commerce St., Williston, VT 05495; 802/658-5506. $25 for owners of SuperGlue; $45 for owners of Glue; $119.95 new.

Synchronicity version 2.0 is a rewritten and more humorous version of the intuitive question-and-response software. Program size has been compressed from original. Visionary Software, P.O. Box 69191, Portland, OR 97201; 503/246-6200, 800/877-1832. $5.00; $49.95 new.

TextPert version 3.01 reads at an increased speed of 3000 characters per minute. CTA, 747 Third Ave., 3rd Fl., New York, NY 10017; 212/935-2280. Free; $175 new.

Timbuktu version 3.0 includes the ability to transfer files on a local area network, and lets two or more Mac users share screens over AppleTalk networks. Farallon Computing, 2201 Dwight Way, Berkeley, CA 94704; 415/841-5770. $40; $149 new. M

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, *501 Second St., San Francisco, CA 94107.*

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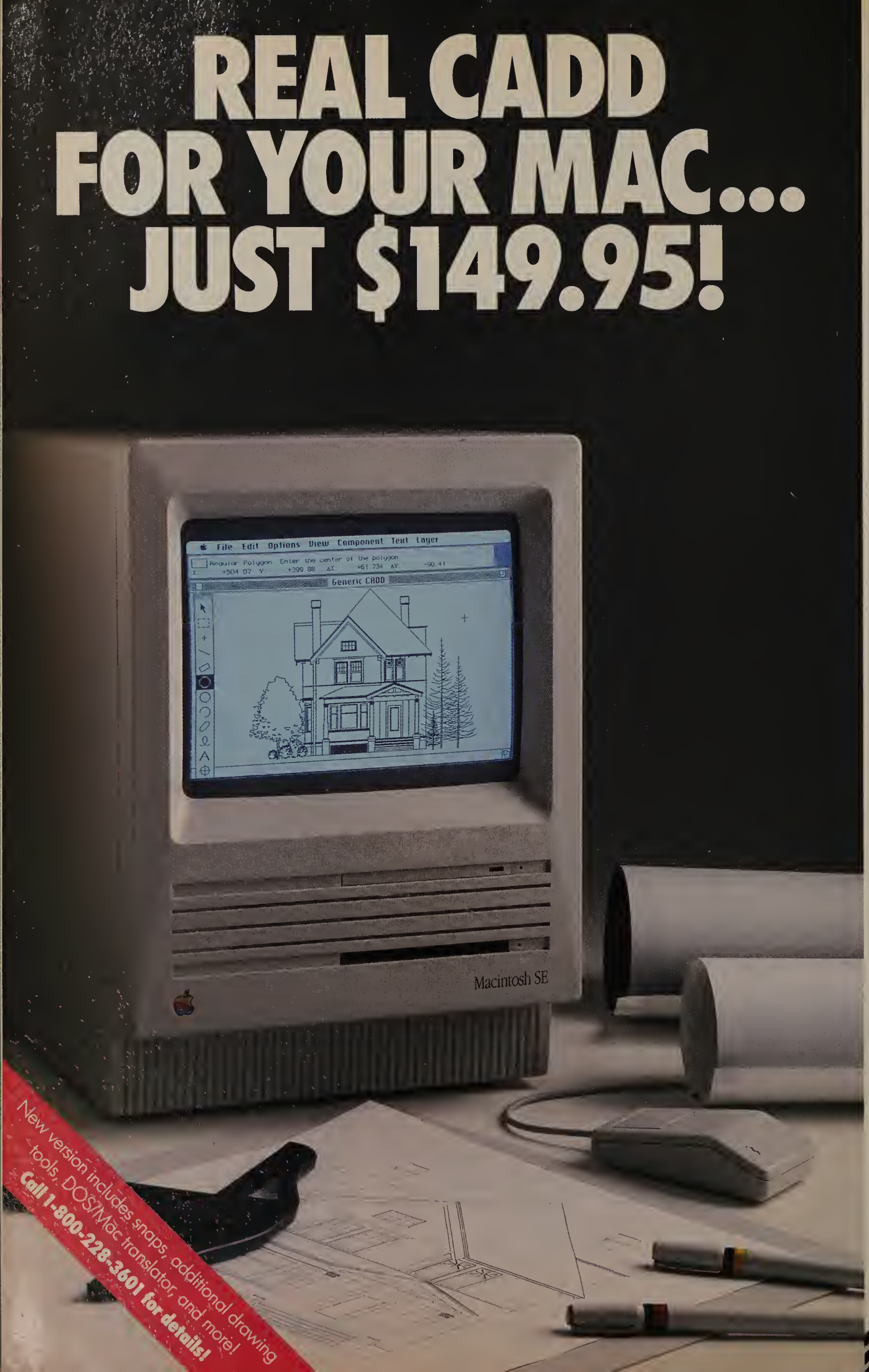

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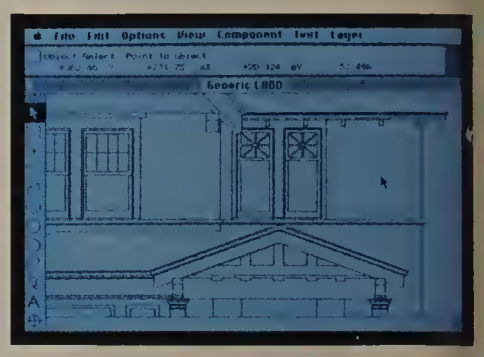

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WHERE TO BUY

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted directly.

Reader Service

A

701 **Acta Advantage** Symmetry Corp., 225 E. First St., #107B, Mesa, AZ 85201; 602/844-2199.

702 **Actinet SE** Actinet Systems, Inc., 360 Cowper St., #11, Palo Alto, CA 94301; 415/326-1321.

703 **Actinet II** Actinet Systems, Inc., 360 Cowper St., #11, Palo Alto, CA 94301; 415/326-1321.

704 **AdCom2-1** Frontier Technologies Corp., 3510 N. Oakland Ave., Milwaukee, WI 53211; 414/964–8689.

705 **a4** Softek Design, 882 Calgary Way, Golden, CO 80401-9363; 303/526-0606.

* **Alias** Kinkos Academic Courseware Exchange, P.O. Box 8022, Ventura, CA 93002-8022; 800/235-6919, 800/292-6640 in CA, 805/652-4158 outside United States.

706 **AlisaTalk/AlisaShare** Alisa Systems, Inc., 221 E. Walnut St., #175, Pasadena, CA 91101; 818/792-9474.

* **The Ancient Art of War at Sea** Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200.

* **Animation Help** BMUG PD Library-HyperCard Section, 1442A Walnut St., #62, Berkeley, CA 94709; 415/549-2684.

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707 **AppleShare** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

708 **AppleTalk for VMS** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

709 **AppleTalk Internet Router** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

710 **ARCNET220/II** Standard Microsystems, Inc., 35 Marcus Blvd., Hauppauge, NY 11788; 516/273-3100.

711 **ARLAN 510-AppleTalk Wireless Router** Telesystems SLW, Inc., 85 Scarsdale Rd., #201, Don Mills, Ontario, Canada M3B 2R2; 416/441-9966.

712 **Atlas Explorer** Springboard Software, Inc., 7808 Creekridge Cir., Minneapolis, MN 55435; 612/944-3915, 800/654-6301.

713 **atOnce** Layered, Inc., 529 Main St., Boston, MA 02129; 617/242-7700.

714 **AT-1 CompuTalk Connector** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

715 **AT-1L Locking CompuTalk Connector** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

716 **ATPLUS3 LocalTalk Concentrator** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

717 **ATPLUS4 LocalTalk Concentrator** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33179; 305/944-7710; 800/446-2377.

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718 **ATPLUS5 LocalTalk Concentrator** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

719 **ATW-1 Smart Wallplate (with CompuTalk connector)** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

720 **AT2000, AT2002** Network Resources Corp., 2450 Autumndale Dr., San Jose, CA 95131; 408/263-8100.

B

* **Back to Basics Professional** Peachtree Software, 4355 Shackleford Rd., Norcross, GA 30093; 404/564-5700.

* **Basics of Digital Voice Technology** Codex Corp., M/S: M3-30, 20 Cabot Blvd., Mansfield, MA 02048; 617/634-2000, ext. 4193.

722 **BelTalk** Belkin Components, 14550 S. Main St., Gardena, CA 90248; 213/515-7585, 800/223-5546.

723 **Bernoulli Box II 44** Iomega Corp., 1821 West 4000 South, Roy, UT 84067; 801/778-1000, 800/456-5522.

724 **BPI Entry Series Accounting** Computer Associates International, 1240 McKay Dr., San Jose, CA 95131; 408/432-1727, 800/531-5236.

725 **BroadTalk LAN** Cactus Computer, Inc., 1120 Metrocrest Dr., #103, Carrollton, TX 75006; 214/416-0525.

726 **Business Sense** Monogram Software, 531 Van Ness Ave., Torrance, CA 90501; 213/533-5120.

Reader Service

C

* **CallBack** The Broadcast Group, Matthew Coates, 1607 New Hampshire Ave. NW, Washington, DC 20009.

* **Carbon Copy Mac** Nexus Development, 19 Staple St., Seventeen Mile Rocks, Queensland, Australia 4073; 617 376 575.

727 **Cirrus 600 Magneto Optical Drive** La Cie, Ltd., 16285 S.W. 85th, #306, Tigard, OR 97224; 503/684-0143.

728 **Cirrus 613** La Cie, Ltd., 16285 S.W. 85th, #306, Tigard, OR 97224; 503/684-0143.

729 **Cisco Routers** Cisco Systems, Inc., 1350 Willow Rd., Menlo Park, CA 94025; 415/326-1941, 800/248-6387.

730 **ColorBoard 264** RasterOps Corp., 2500 Walsh Ave., Santa Clara, CA 94051; 408/446-4090.

731 **Color Mac II** Maxis Software, Inc., 953 Mountain View Dr., #113, Lafayette, CA 94549; 415/376-6434.

732 **Components General Ledger** Satori Software, 2815 Second Ave., #560, Seattle, WA 98121; 206/443-0765.

733 **CompuNet** Trimar USA, Inc., 236 W. 15th St., New York, NY 10011; 212/645-7008, 800/872-4454.

734 **Computerized Classic Bookkeeping** Absolute Solutions, Inc., 3142 Vista Way, #400, Oceanside, CA 92056; 800/633-7666.

735 **Cosmic Osmo** Activision Entertainment, 3885 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.

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736 **C-Server** Solana Electronics, 7124 Convoy Ct., San Diego, CA 92111; 619/573-0801.

D

- **Dortmouth XCMD's, Valumes I–III** Kinkos Academic Courseware Exchange, P.O. Box 8022, Ventura, CA 93002-8022; 800/235-6919, 800/292-6640 in CA, 805/652-4158 outside U.S.
- **DotoFrome XP 330** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.

737 **DoynoNet LocolTolk** Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

738 **DoynoTolk** Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

739 **DoynoTolk PC** Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203.

740 **Déjò Vu II: Last in Las Vegas** ICOM Simulations, 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440

741 **DirectDrive 300** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.

742 **DirectServe** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.

- **Doko Koro Kitono? (Where Is the Cat From?)** 2826 Lyon St., San Francisco, CA 94123.

E

- **The '88 Vate, Campoign for the White House** Optical Data Corp., 30 Technology Dr., Warren, NJ 07060; 201/668-0022, 800/524-2481.

743 **Electronic Mop Cobinet** Highlighted Data, 6628 Midhill Pl., Falls Church, VA 22043; 703/533-1939.

- **The Electronic Whole Eorth Cotalog** Broderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200.

744 **EtherLink/NB** 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052; 408/562-6400. .

745 **EtherLink/SE** 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052; 408/562-6400.

746 **Ether+** Compatible Systems, Inc., P.O. Drawer 17220, Boulder, CO 80308; 303/444-9532, 800/356-0283.

747 **EtherPort SE** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

748 **EtherPart SE/L** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

749 **EtherPart SE/30** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

750 **EtherPart SE/30L** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

751 **EtherPart II** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

752 **EtherPart IIL** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

753 **EtherPort IIL** SynOptics Communications, Inc., 501 E. Middlefield Rd., Mountain View, CA 94043; 415/960-0998.

754 **EtherSC** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

755 **EtherTalk NB Card** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

- **Excel** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

756 **Expressionist** Allan Bonadio Associates, 814 Castro St., San Francisco, CA 94114; 415/282-5864.

F

757 **Fomily Matters** Springboard Software, Inc., 7808 Creekridge Cir., Minneapolis, MN 55435; 612/944-3915, 800/654-6301.

758 **FastNet AE** Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.

759 **FastNetSCSI** Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.

760 **FastNet SE** Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.

761 **FostNet II** Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.

762 **FastNet III** Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405; 919/763-7918, 800/622-7627.

763 **FastPath 4** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

- **Fedit** Shareware.

764 **Fiber Optic AppleTalk Cancentratar** The Du Pont Company, 9316 Cove Dr., Myrtle Beach, SC 29572; 803/449-6123.

765 **Fiber Optic AppleTolk Canverter** The Du Pont Company, 9316 Cove Dr., Myrtle Beach, SC 29572; 803/449-6123.

766 **Flexwore** Microfinancial Corp., 15404 E. Valley Blvd., Industry, CA 91746; 818/961-0237, 800/527-6587.

767 **Flawer** Iota, 7713 Shadow Hill Ln., Houston, TX 77072; 713/530-0542.

768 **Formulotar** ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

769 **For the Record** Nolo Press, 950 Parker St., Berkeley, CA 94707; 415/549-1976, 800/992-6656.

770 **4th & Inches** Accolade, Inc., 550 S. Winchester Blvd., #200, San Jose, CA 95128; 408/985-1700.

- **Freedom Troil** BCS Mac, MacStackGroup, Boston Computer Society, 1 Center Plaza, Boston, MA 02018; 617/367-8080.

771 **FS100** DayStar Digital, Inc., 5556 Atlanta Hwy., Flower Branch, GA 30542; 404/967-2077, 800/962-2077.

772 **Full Impact** Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000, 800/437-4329.

G

773 **GotarBax** Cayman Systems, Inc., 26 Landsdowne St., Cambridge, MA 02139; 617/494-1999.

774 **GatarBax T** Cayman Systems, Inc., 26 Landsdowne St., Cambridge, MA 02139; 617/494-1999.

775 **GotarCard E/SE** Cayman Systems, Inc., 26 Landsdowne St., Cambridge, MA 02139; 617/494-1999.

776 **GatarCard E/II** Cayman Systems, Inc., 26 Landsdowne St., Cambridge, MA 02139; 617/494-1999.

777 **GatarCard E/30** Cayman Systems, Inc., 26 Landsdowne St., Cambridge, MA 02139; 617/494-1999.

778 **Genesis 6000** Macsetra Technologies International, Inc., 2414 Koyl Ave., Saskatoon, Sask., Canada S7L 7L5; 306/934-6044.

- **Glabal Tresposs** Mysterium Tremendum, 3804 Washington, Oak Brook, IL 60521.
- **Galf Dactar** 1 Step Software, Inc., 510 Griffith Rd., Charlotte, NC 28217.

779 **Great Ploins Accounting Series** Great Plains Software, 1701 S.W. 38th St., Fargo,

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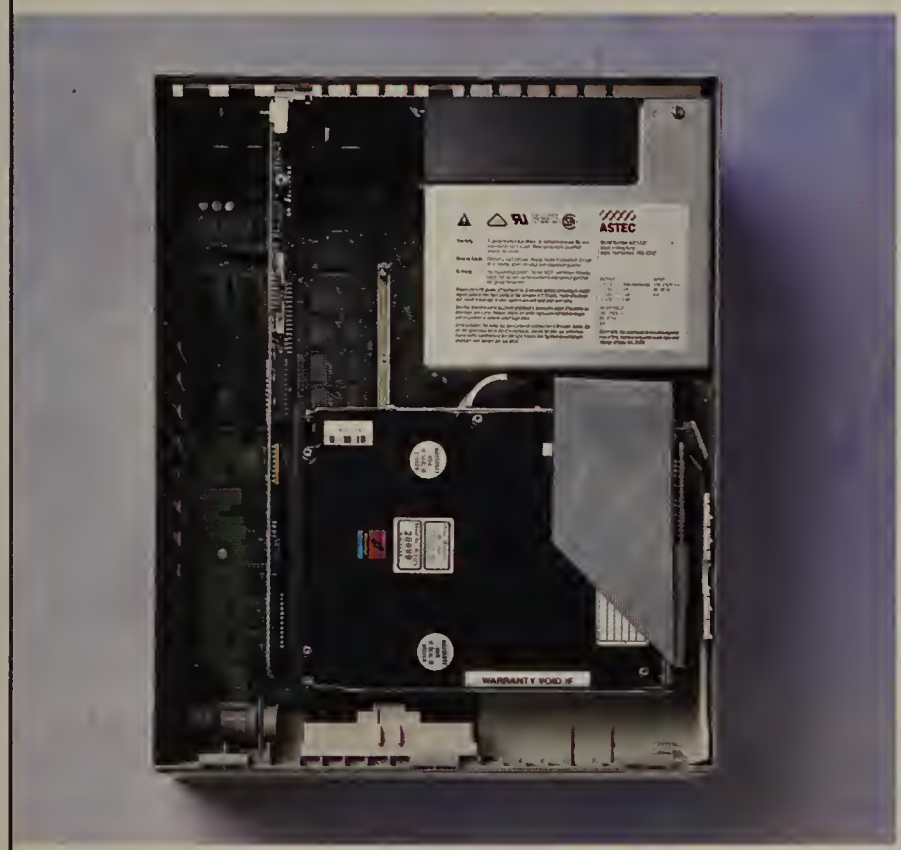

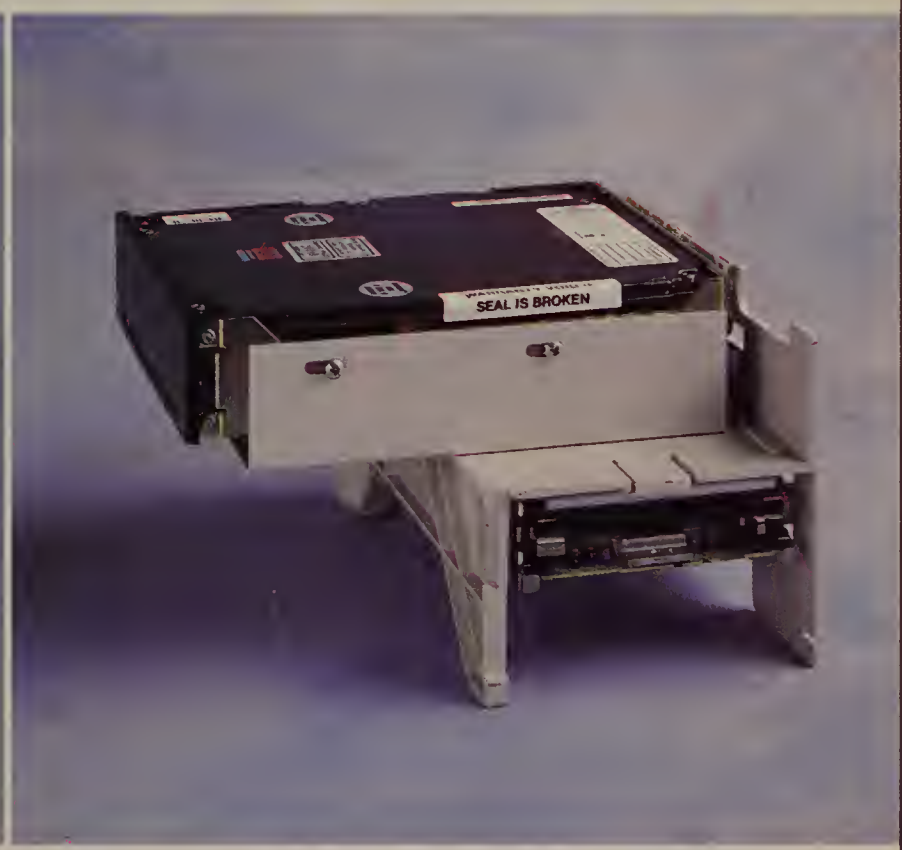

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780 **hammer300** FWB, Inc., 2040 Polk St., #215, San Francisco, CA 94109; 415/474-8055.

781 **hammer600** FWB, Inc., 2040 Polk St., #215, San Francisco, CA 94109; 415/474-8055.

782 **Hard Disk DeadBolt** FWB, Inc., 2040 Polk St., #215, San Francisco, CA 94109; 415/474-8055.

783 **Hard 300 Plus** Relax Technology, 3101 Whipple Rd., #22, Union City, CA 94587; 415/471-6112, 800/848-1313.

784 **Hard 330 Plus** Relax Technology, 3101 Whipple Rd., #22, Union City, CA 94587; 415/471-6112, 800/848-1313.

785 **Hard 600 Plus** Relax Technology, 3101 Whipple Rd., #22, Union City, CA 94587; 415/471-6112, 800/848-1313.

786 **Harmony Grid** Hip Software Corp., 117 Harvard St., #3, Cambridge, MA 02139; 617/661-2447.

787 **Hidden Agenda** Springboard Software, Inc., 7808 Creekridge Cir., Minneapolis, MN 55435; 612/944-3915, 800/654-6301.

788 **HiPerformance 320** ProCom Technology, Inc., 200 McCormick, Costa Mesa, CA 92626; 714/549-9449.

789 **HiPerformance 650** ProCom Technology, Inc., 200 McCormick, Costa Mesa, CA 92626; 714/549-9449.

• **HyperCard and History** Steve Grass, 3604 Luneta Ln., Fallbrook, CA 92028.

• **HyperComposer** Addison-Wesley Publishing Co., Route 128, Reading, MA 01867; 617/944-3700.

790 **HyperOne** Hyperpress Publishing Corp., P.O. Box 8243, Foster City, CA 94404; 415/345-4620.

• **HyperSound** Farallon Computing, 2201 Dwight Way, Berkeley, CA 94704; 415/849-2331.

I

• **If Monks Had Macs (includes Passing Notes)** BMUG PD Library-HyperCard Section, 1442A Walnut St., #62, Berkeley, CA 94709; 415/549-2684.

791 **ImageWriter II/LQ LocalTalk Option** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

792 **Insight Expert Accounting** Layered, Inc., 529 Main St., Boston, MA 02129; 617/242-7700.

793 **Insight OneWrite** Layered, Inc., 529 Main St., Boston, MA 02129; 617/242-7700.

794 **Integra 300** Dolphin Systems Technology, 1701 E. Edinger Ave., Bldg. G, Santa Ana, CA 92705; 714/558-3220.

• **IntelliNet** Nexsys, 269 Elizabeth St., New York, NY 10012.

795 **InterBridge** Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348; 404/441-1617.

796 **InterTalk 2** P-Ingenerie, Inc., 500 Sutter St., #222, San Francisco, CA 94102; 415/397-4666.

797 **IPT BB** Information Presentation Technologies, 23801 Calabasas Rd., #2011, Calabasas, CA 91302; 818/347-7791, 800/233-9993.

798 **IPT 230/A** Information Presentation Technologies, 23801 Calabasas Rd., #2011, Calabasas, CA 91302; 818/347-7791, 800/233-9993.

799 **IPT 1000 (SE)** Information Presentation Technologies, 23801 Calabasas Rd., #2011, Calabasas, CA 91302; 818/347-7791, 800/233-9993.

800 **I-Server** Solana Electronics, 7124 Convoy Ct., San Diego, CA 92111; 619/573-0801.

J

801 **Jasmine DirectOptical** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.

K

802 **KanjiCards** Hyper-Glot Software, 505 Forest Hills Blvd., Knoxville, TN 37919; 800/726-5087.

803 **K-Share** Kinetics, a division of Excelan, 1340 Treat Blvd., #500, Walnut Creek, CA 94596; 415/947-0998.

L

804 **LANstor Interface Board** Northern Telecom, 2305 Mission College Blvd., Santa Clara, CA 95054; 408/988-5550, 800/328-8800.

• **Letter Learner** Robert Orenstein, P.O. Box 1381, Venice, CA 90294; and local user groups.

805 **Liaison** Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201; 503/226-3620, 800/445-7085.

806 **LinkStor 8** Thor Manufacturing, P.O. Box 1742, Reno, NV 89505; 702/345-6533, 800/346-4694.

807 **LocalTalk** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

808 **LP-1 Local PhoneTalk connector** AESP, Inc., 1810 N.E. 144th St., North Miami Beach, FL 33181; 305/944-7710; 800/446-2377.

809 **LT2000** Network Resources Corp., 2450 Autumndale Dr., San Jose, CA 95131; 408/263-8100.

M

810 **MacCon SE/E** Asante Technologies, Inc., 1050 E. Duane Ave., Ste. G, Sunnyvale, CA 94086; 408/736-3360.

811 **MacCon SE30/E** Asante Technologies, Inc., 1050 E. Duane Ave., Ste. G, Sunnyvale, CA 94086; 408/736-3360.

812 **MacCon II/E** Asante Technologies, Inc., 1050 E. Duane Ave., Ste. G, Sunnyvale, CA 94086; 408/736-3360.

813 **MacCon II/TR** Asante Technologies, Inc., 1050 E. Duane Ave., Ste. G, Sunnyvale, CA 94086; 408/736-3360.

814 **MacCrate 300** Crate Technology, 6850 Vineland, Bldg. M, North Hollywood, CA 91605; 818/766-4001.

815 **MacCrate 600** Crate Technology, 6850 Vineland, Bldg. M, North Hollywood, CA 91605; 818/766-4001.

816 **MacDisk EM330** Priam Corp., 20 W. Montague Expwy., San Jose, CA 95134-2085; 408/434-9300, 800/227-2917.

817 **MacinStor 320** Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

818 **MacinStor 345** Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

819 **MacinStor 595** Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

820 **MacinStor 650** Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

821 **MacLan Connect** Miramar Systems, Inc., 201 N. Salsipuedes, #205, Santa Barbara, CA 93103; 805/965-5161.

• **MacLife** HeartBeat Software Solutions, P.O. Box 4497, Cerritos, CA 90703-4497.

822 **MacRing** h-three Systems Corp., P.O. Box 12557, Research Triangle Park, NC 27709; 919/549-8334, 800/622-7464.

823 **MacServe** Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201; 503/226-3620, 800/445-7085.

824 **Mac2000** Network Resources Corp., 2450 Autumndale Dr., San Jose, CA 95131; 408/263-8100.

825 **MacX25** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

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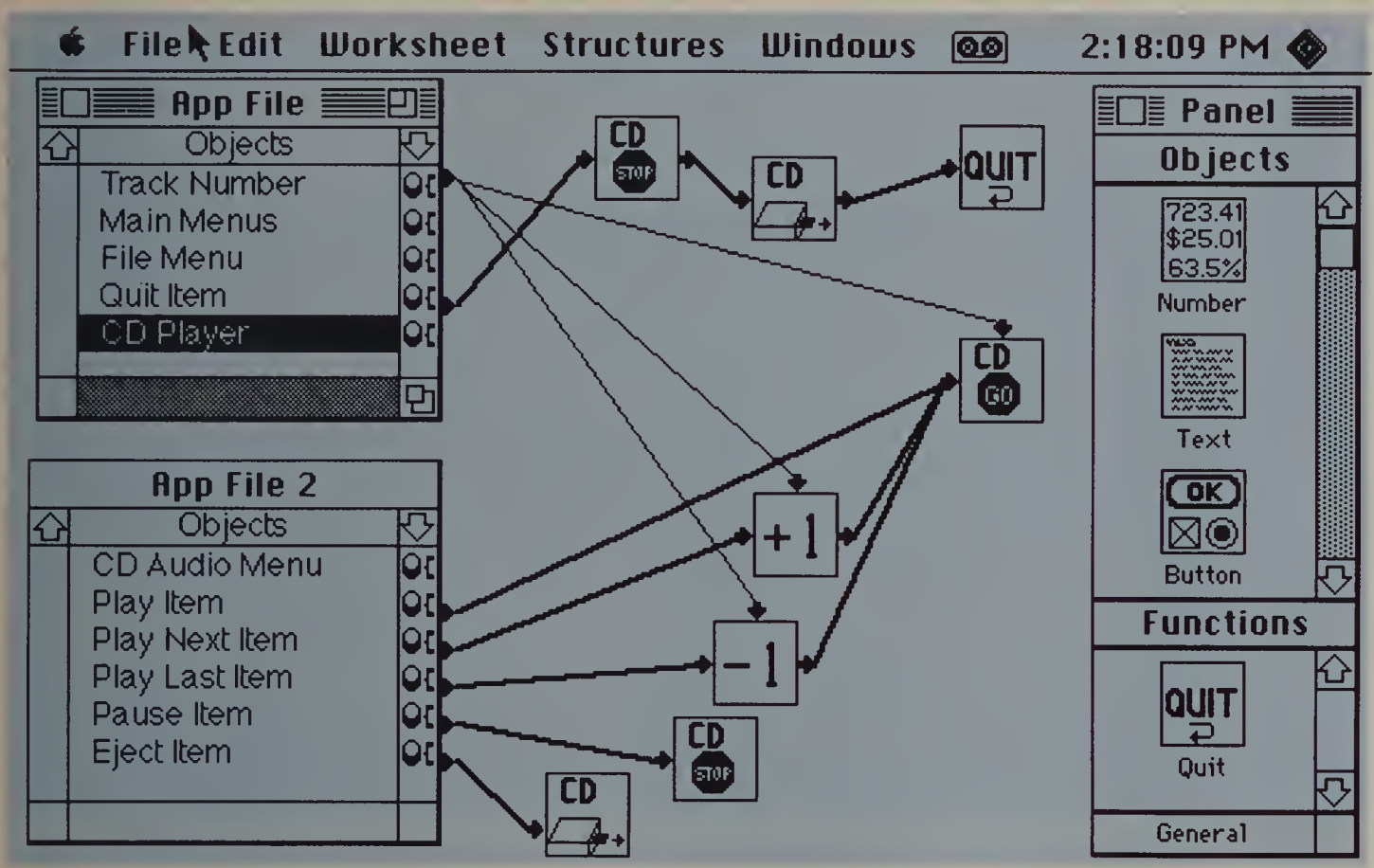

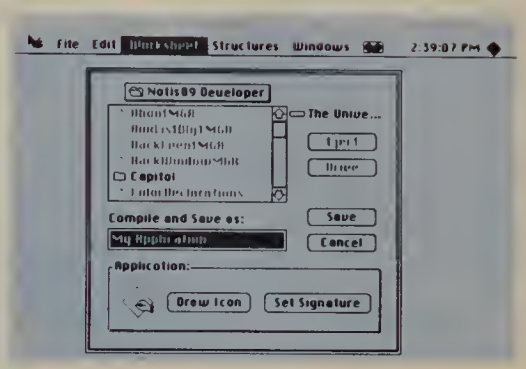

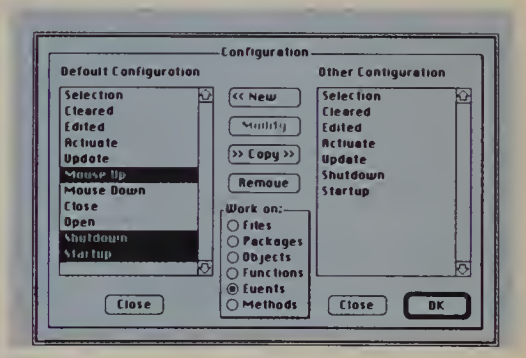

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828 **Mogic 600** MacProducts USA, 8303 Mopac Expwy., #218, Austin, TX 78759-8369; 512/343-9441, 800/622-3475.

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831 **MothType** Design Science, Inc., 6475-B E. Pacific Coast Hwy., Long Beach, CA 90803; 213/433-0685.

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835 **MiniCod+** Graphsoft, Inc., 8370 Court Ave., #202, Ellicott City, MD 21403; 301/461-9488.

836 **MixNet 8884** Thor Manufacturing, P.O. Box 1742, Reno, NV 89505; 702/345-6533, 800/346-4694.

837 **ModuNet** DataSpec, 20120 Plummer St., Chatsworth, CA 91313; 818/701-5848.

• **MountEm** Shareware.

• **Movies on Video** Rosegroup, 1642 W. 23rd St., San Pedro, CA 90732.

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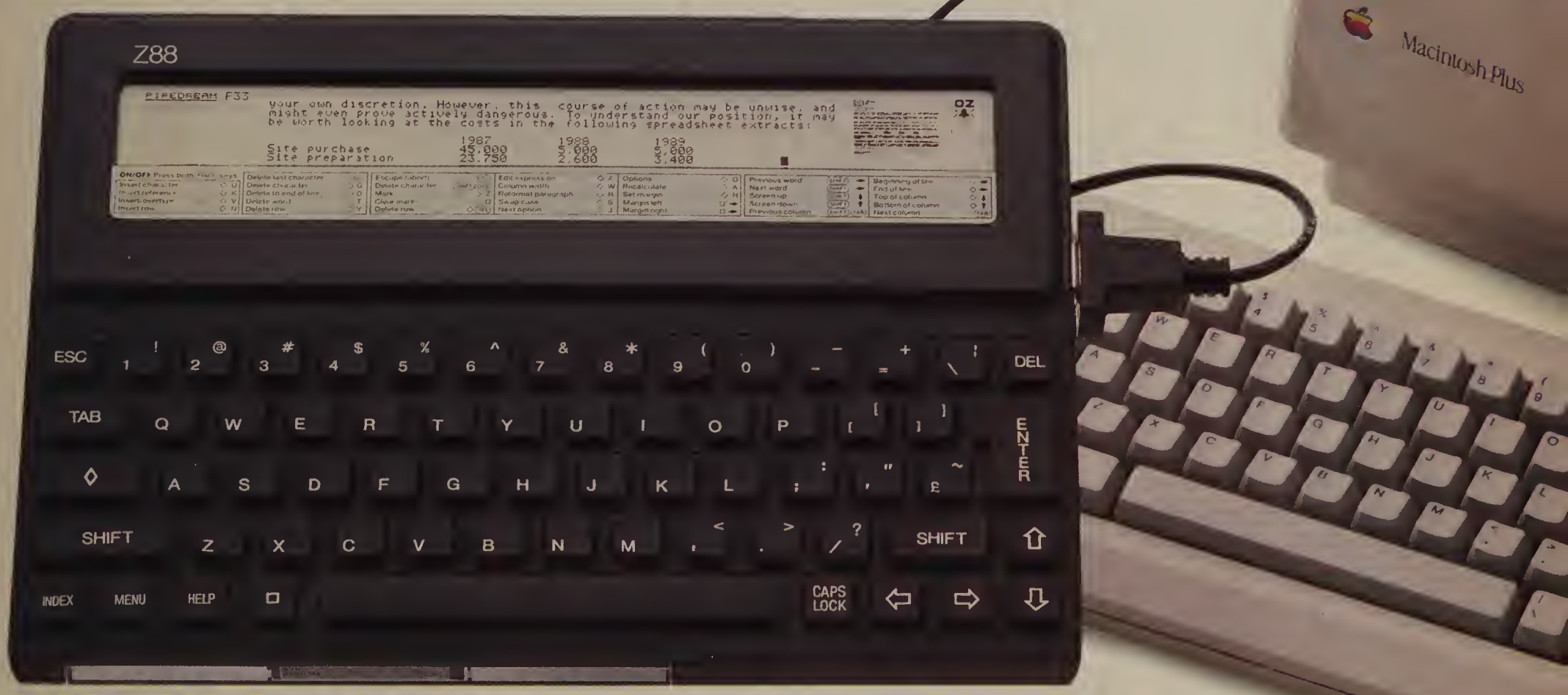

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Mail-order sales must comply with the rules of the Federal Trade Commission (FTC) and various state laws. Here are some guidelines to alert you to your rights and help you shop by mail more effectively.

THE FTC MAIL ORDER RULES STATE:

1. The Seller must ship your order within 30 days of receiving it, unless clearly stated otherwise in the advertisement.
2. If the Seller cannot ship your order when promised, you must be notified in writing prior to the promised date. The notice must specify a new date if available, and must give you the opportunity to (a) cancel with a refund; (b) agree to a specified delayed shipping date; or (c) agree to an indefinite delay.
3. The Seller's notice must include a postage-paid reply envelope or card so that you may indicate your preference. If you do not respond, the Seller may assume you agree to the delay.
4. Even if you agree to an indefinite delay, you retain the right to cancel at any time before the merchandise has been shipped.
5. If you cancel an order that has been paid by check or money order, the Seller is obligated to mail your refund within seven business days. If you paid by credit card, the Seller must credit your account within one billing cycle following receipt of your cancellation. Store credits or vouchers are not acceptable in place of a refund.
6. If the item you order is unavailable, the Seller may not send you substitute merchandise without your consent.

DO'S AND DON'TS

By mail:

- Compare prices, including sales tax and shipping fees, before you order. Your purchase may be exempt from sales tax—check your state laws on collection regulations. Handling, packing, and shipping fees are legal and most states tax these services.
- State the precise specifications of the merchandise, such as model, make, size, component parts, etc.
- Confirm the price and expected delivery date as advertised.
- State on your order whether you will accept substitute merchandise if the item you specified is unavailable. If you won't accept a substitute, state that your payment should be returned.
- Record of payment is essential if a problem arises, so do not send cash.
- Keep copies of your order and all associated correspondence. Your records should include the company's name, address, and phone number; a description of the merchandise; your canceled check or money-order carbon; the date you mailed the order; and any sales slips and shipping receipts.
- Do not insure your order. It is the Seller's responsibility to make sure you receive your merchandise.

By phone:

- Note the name of the person who takes your order, and the time and date of your conversation.
- Make a record of your order, the price, promised availability, and the expected components.
- Save all correspondence, including your canceled check or money-order carbon and any written confirmation sent by the Seller.

Questions to ask:

- Does the advertised merchandise include all necessary parts and accessories? Are they made by the same manufacturer? Is the version number or model number the same? Is the product compatible with the hardware/software you intend to use it with?
- Can your order be shipped immediately? If not, when will it be available for shipping?
- Has the advertised price increased?
- What warranties does the merchandise carry? Who provides the service?
- What is the Seller's return policy? Exchange or repair? The refund policy?
- If a problem arises, with whom should you correspond?

PROBLEMS? SOLUTIONS:

1. If you do not receive your order as promised or if the merchandise is defective, write to the Seller immediately. Include a description of your order, the price, date, and account number or order number if available. Keep a copy of your letter.
2. If you register your complaint by phone, send a follow-up letter to confirm and keep a copy of it.
3. If you think the merchandise is defective, review your product instructions and warranty carefully. Make sure you expect only those features and abilities that the product is supposed to have. Then contact the Seller for procedures. Do not return the merchandise until you have been instructed to do so.
4. If you return the merchandise, keep the shipper's receipt or packing slip. Your right to reimbursement of postal costs is determined by store policy.
5. If you have discussed your problem thoroughly with the Seller and remain dissatisfied, write to the consumer complaint agency in the Seller's state. If you paid for the merchandise by credit card, you may have the right to withhold payment under the Federal Trade Commission's Fair Credit Billing Act.

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CMS Enhancements 30 *32ms*	$589.	**$489.**
Cutting Edge 32 *30ms*	$579.	**$484.**
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40 Megabyte		
Caché Systems 45 *28ms*	$629.	**$549.**
CMS Enhancements 45 *32ms*	$649.	**$589.**
Cutting Edge 47 *30ms*	$649.	**$539.**
MacBEST 40 *28ms*	$599.	**$569.**
Quantum 40* *19ms*	$699.	**$599.**
60 Megabyte		
Caché Systems 60 *28ms*	$729.	**$579.**
CMS Enhancements 60 *40ms*	$749.	**$689.**
Cutting Edge 60 *28ms*	$699.	**$599.**
MacBEST 60 *28ms*	$729.	**$649.**
80 Megabyte		
Caché Systems 80 *28ms*	$849.	**$679.**
CMS Enhancements 81 *28ms*	$899.	**$779.**
Cutting Edge 85 *28ms*	$725.	**$699.**
MacBEST 80 *28ms*	$849.	**$749.**
Quantum 80* *19ms*	$949.	**$849.**
90-100 Megabyte		
CMS Platinum PD 90 *18ms*	$1,049.	**$899.**
MacBEST 105 *25ms*	$999.	**$939.**
Quantum 105* *19ms*	$1,099.	**$999.**
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Caché Systems 150 *16ms*	$1,499.	**$1,299.**
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CMS Enhancements 170 *18ms*	$1,799.	**$1,589.**
MacBEST 180 *18ms*	$1,749.	**$1,659.**
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CMS Enhancements PD 300 *16ms*	$2,349.	**$2,179.**
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MacBEST 300 *16ms*	$2,349.	**$2,179.**

SE Internals

30 Megabyte		
Caché Systems 30 *28ms*	$425.	**$375.**
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Cutting Edge 32 *30ms*	$479.	**$395.**
MacBEST 30 *28ms*	$449.	**$399.**
40 Megabyte		
Caché Systems 45 *28ms*	$499.	**$449.**
CMS Enhancements Pro 45 *32ms*	$569.	**$469.**
Cutting Edge 47 *30ms*	$529.	**$444.**
MacBEST 45 *28ms*	$499.	**$465.**
Quantum 40* *19ms*	$599.	**$499.**
80 Megabyte		
Quantum 80* *19ms*	$889.	**$699.**
100 Megabyte		
MacBEST 105 *25ms*	$949.	**$859.**
Quantum 105* *19ms*	$999.	**$849.**
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40 Megabyte		
Caché Systems 45 *28ms*†	$499.	**$449.**
CMS Enhancements Pro 45 *32ms*†	$569.	**$469.**
Cutting Edge 47 *30ms*	$529.	**$444.**
MacBEST 45 *28ms*	$499.	**$479.**
Quantum 40* *19ms*†	$599.	**$499.**
60 Megabyte		
Caché Systems 60 *28ms*	$639.	**$499.**
CMS Enhancements Pro 60 *40ms*	$649.	**$539.**
Cutting Edge 60 *28ms*	$679.	**$489.**
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80 Megabyte		
Caché Systems 80 *28ms*	$729.	**$575.**
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MacBEST 80 *28ms*	$749.	**$679.**
Quantum 80* *19ms*†	$849.	**$699.**
90-100 Megabyte		
CMS Enhancements Pl 90 *18ms*	$999.	**$815.**
MacBEST 105 *25ms*†	$949.	**$859.**
Quantum 105* *19ms*†	$899.	**$849.**
Connor 100 *25ms*†	$849.	**$749.**
150-173 Megabyte		
Caché Systems 150 *16ms*	$1,429.	**$1,199.**
CMS Enhancements 170 *16ms*	$1,699.	**$1,499.**
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MacBEST 300 *17ms*	$1,999.	**$1,899.**
600 Megabyte		
CMS Enhancements PL 600 *16ms*	$2,999.	**$2,779.**
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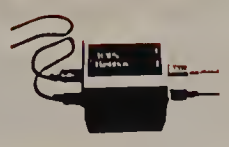

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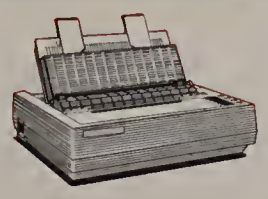

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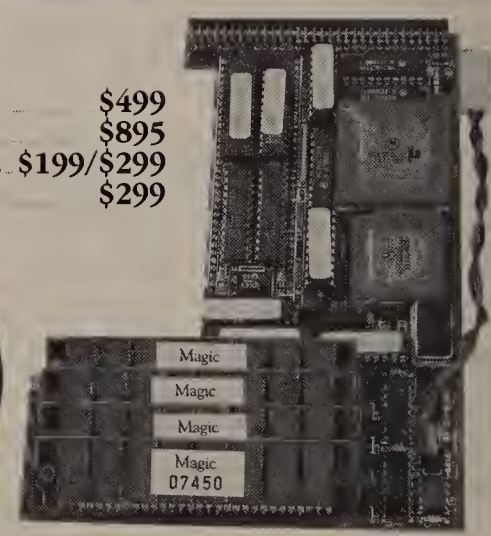

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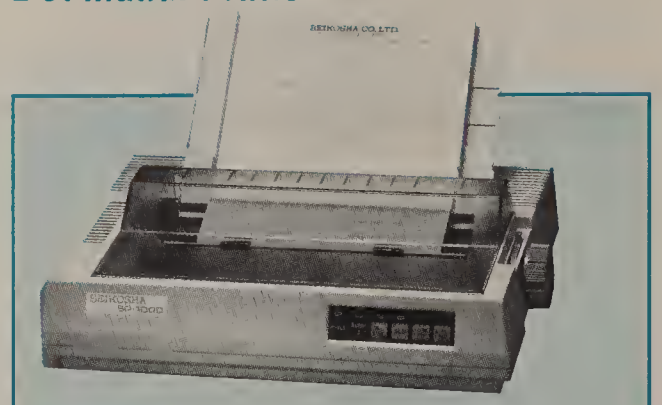

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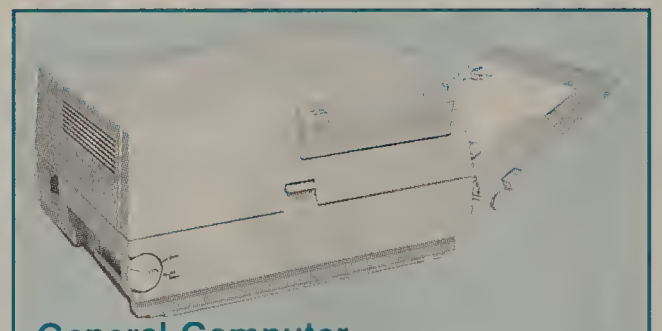

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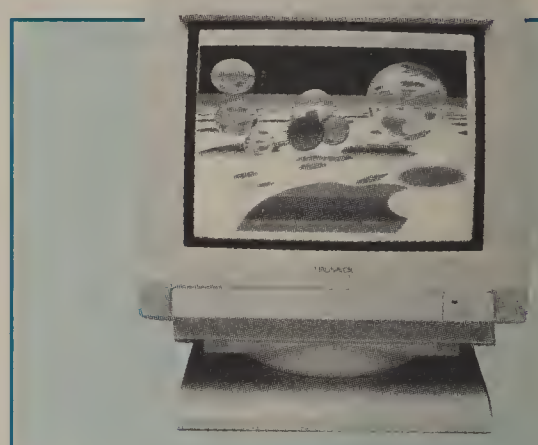

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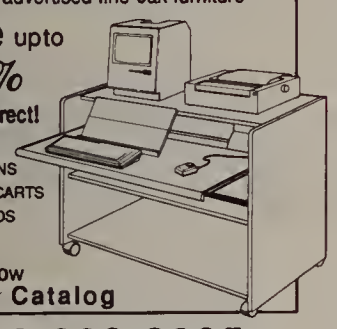

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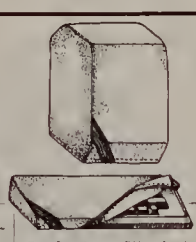

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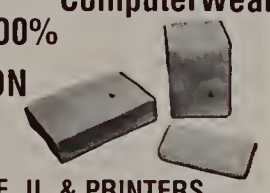

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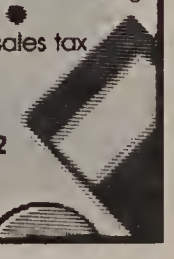

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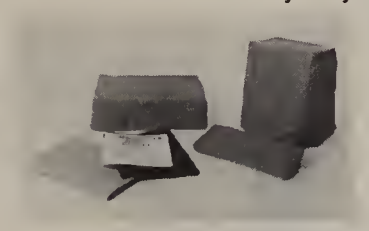

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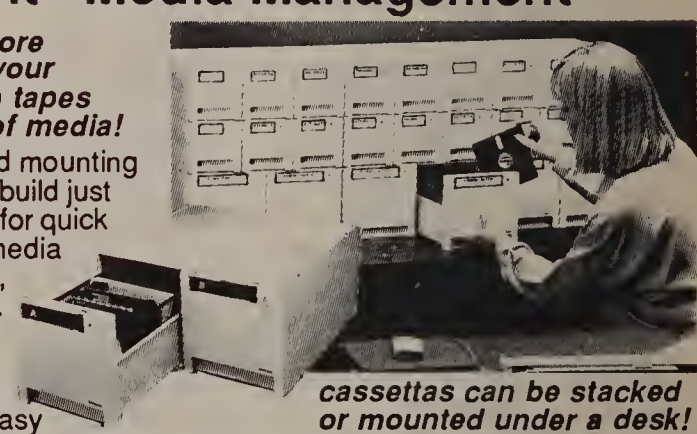

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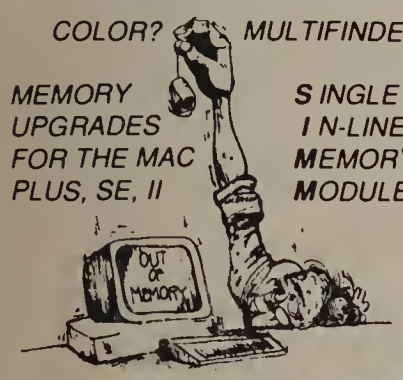

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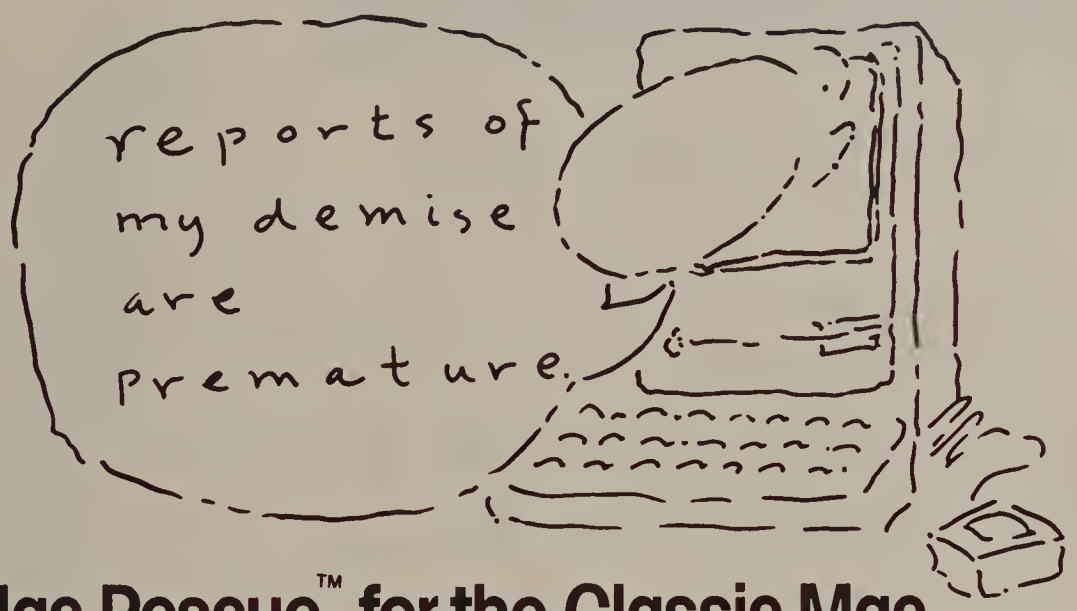

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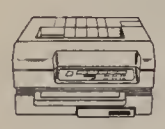

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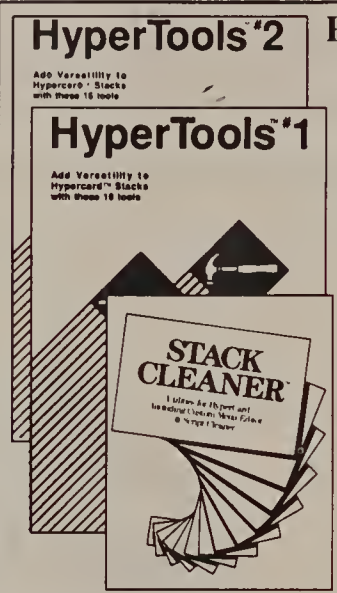

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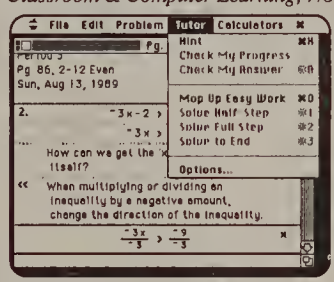

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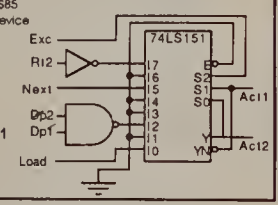

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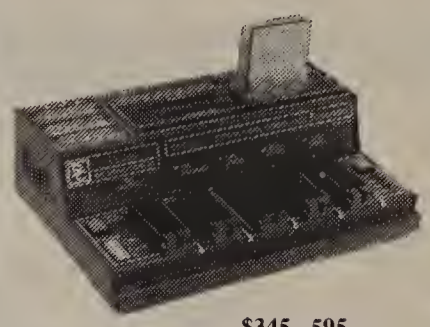

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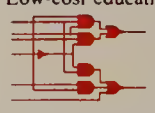

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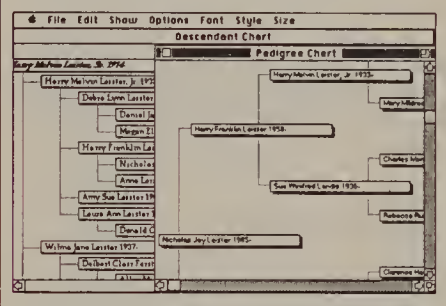

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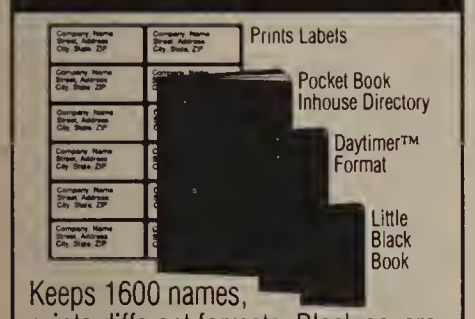

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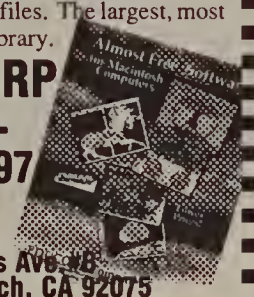

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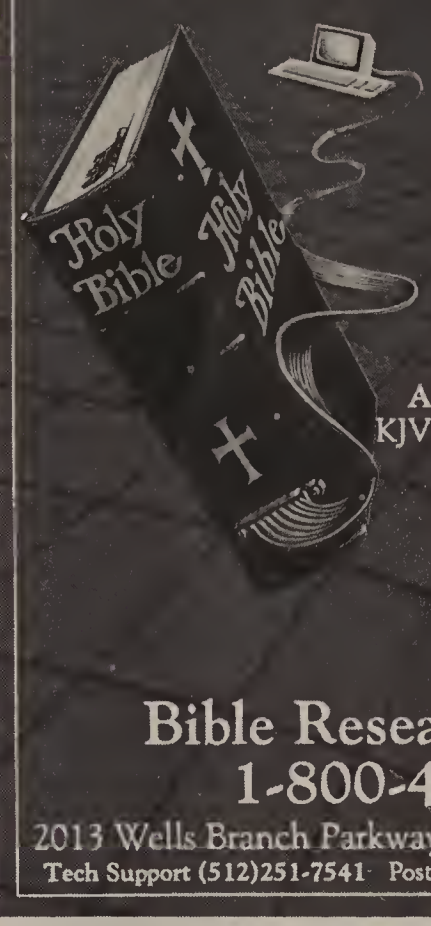

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BEST-SELLERS

BUSINESS SOFTWARE

Months on chart	Last month	This month		
54	1	1	**Microsoft Word**	*Microsoft*
45	3	2	**Microsoft Excel**	*Microsoft*
41	4	3	**PageMaker**	*Aldus*
33	2	4	**Microsoft Works**	*Microsoft*
30	5	5	**MacWrite**	*Claris*
7	—	6	**FreeHand**	*Aldus*
14	6	7	**WordPerfect for the Macintosh**	*WordPerfect*
43	8	8	**MacDraw**	*Claris*
9	—	9	**QuarkXPress**	*Quark*
11	7	10	**FileMaker II**	*Claris*

EDUCATION SOFTWARE

Months on chart	Last month	This month		
37	3	1	**Math Blaster**	*Davidson & Associates*
21	2	2	**Reader Rabbit**	*The Learning Company*
8	1	3	**Where in the World Is Carmen Sandiego?**	*Brøderbund*
34	4	4	**Typing Tutor**	*Simon & Schuster Computer Software*
31	—	5	**KidsTime**	*Great Wave Software*

ENTERTAINMENT SOFTWARE

Months on chart	Last month	This month		
33	1	1	**Dark Castle**	*Silicon Beach Software*
36	3	2	**Flight Simulator**	*Microsoft*
5	—	3	**Crystal Quest**	*Casady & Greene*
37	2	4	**MacGolf**	*PCAI*
17	4	5	**Falcon**	*Spectrum HoloByte*

NETWORK/DATA COMMUNICATIONS

Months on chart	Last month	This month		
33	1	1	**TOPS**	*TOPS*
29	4	2	**AppleShare**	*Apple Computer*
22	3	3	**PhoneNet**	*Farallon Computing*
36	2	4	**LocalTalk**	*Apple Computer*
1	—	5	**TurboNet**	*Nuvotech*

HARD DISKS*

Months on chart	Last month	This month		
14	1	1	**MacStack SD20**	*CMS Enhancements*
1	—	2	**EMAC 40 External**	*Everex*
7	4	3	**DataFrame 30/XP30**	*SuperMac Technology*
28	5	4	**Apple Hard Disk 20SC**	*Apple Computer*
19	3	5	**Rodime 20 Plus External**	*Rodime*

ADD-IN BOARDS/MEMORY

Months on chart	Last month	This month		
11	1	1	**Video Board/Large Screen**	*Ryad*
11	2	2	**Radius Interface Display**	*Radius*
23	4	3	**Apple 2MB Memory Expansion Kit**	*Apple Computer*
14	—	4	**Macintosh II Video Card**	*Apple Computer*
23	3	5	**Radius Accelerator**	*Radius*

PRODUCT WATCH

Editors' choice of other recent or forthcoming products of particular interest.

FoxGraph/Mac *Fox Software* Business and presentation program

Serius 89 *Serius Corporation* Icon-based development tool

Wallaby Laptop System *Wallaby Systems* Compact Mac peripheral/laptop

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during July 1989.

**Does not include hard disks installed at the factory.*

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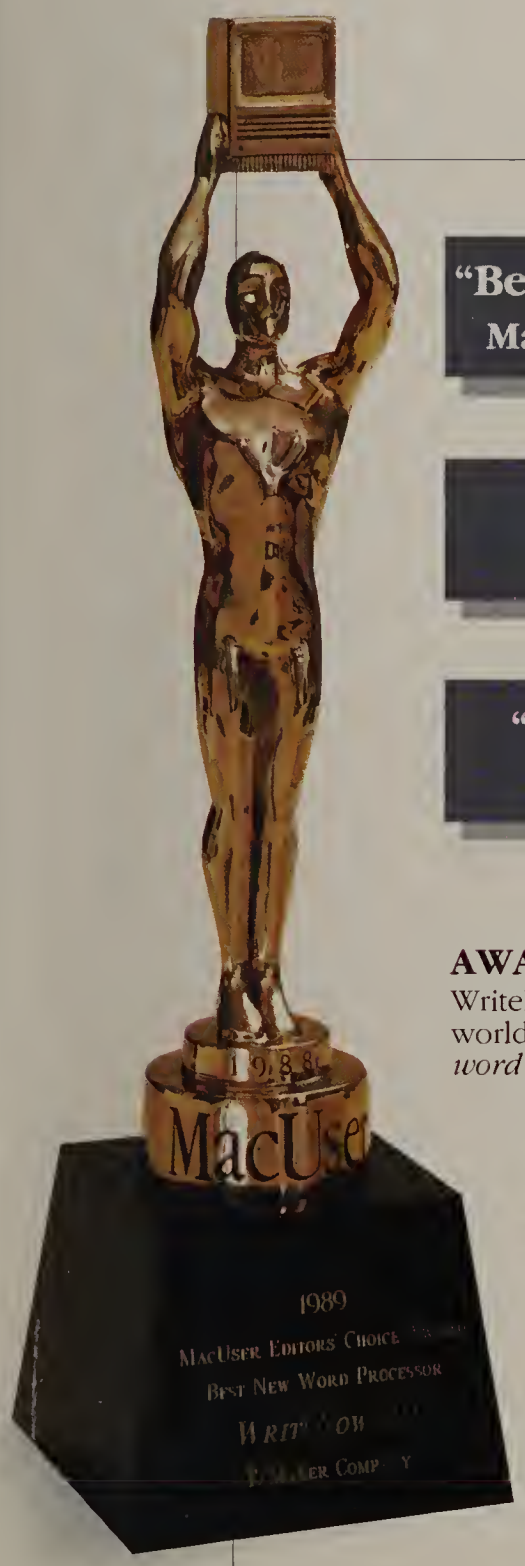
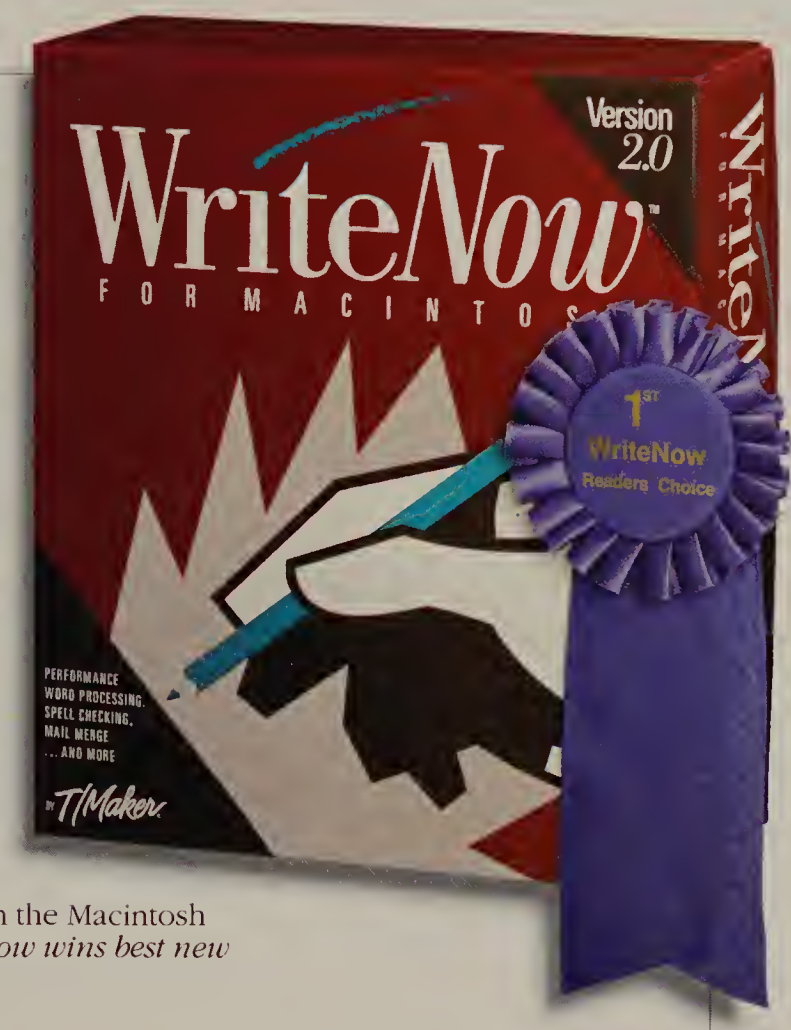


"Best New Word Processor"
MacUser Magazine, May 1989

"Readers' Choice"
MACazine, January 1989

"Golden Gavel Award"
MacGuide, Winter 1988



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MacWrite II	45.9 sec.	40.2 sec.	33.6 sec.	44.7 sec.	24.7 sec.
MS Works 2.0	1 min. 50.8 sec.	35.7 sec.	5 min. 13.4 sec.	2 min. 24.1 sec.	1 min. 14.5 sec.
MS Word 4.0	21.6 sec.	11.0 sec.	3 min. 55.1 sec.	39.4 sec.	25.8 sec.

All tests performed starting with a 12-page text document on a Macintosh Plus with a 20 megabyte hard disk. Full repagination performed when necessary. © 1989 T/Maker Company. All rights reserved. The following are registered and unregistered trademarks of the companies listed: WriteNow, licensed to T/Maker Co. Macintosh, Apple Computer, Inc. MacWrite, Claris Corp., Microsoft, Microsoft Corp.

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